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"Scire est nescire, nisi id me
Scire alius sciret."

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IS OPSONIC TREATMENT USEFUL IN PHTHISIS?[1]

BY

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THIS question, often asked by interested patients and their relatives, is still met by the majority of family doctors with an answer in the negative, and an appeal to a consultant does not usually result in any material alteration in the advice given.

Although the object of this paper is to incline readers to an opposite verdict, one cannot complain of the adoption of a cautious attitude. Those old enough in practice to remember the sequence of events on the introduction of Koch's original tuberculin, and those young enough to be impressed with the definite results often following the administration of single doses of vaccines in the infinitesimal amounts now used, are both readily justified in this attitude. Tuberculin, if used at all, must not be placed on the same level with a new drug or "combination" recommended to our notice by the manufacturing chemists. The recognition

[1] Read before the Bristol and Bath Branch of the British Medical Association at Bath on April 29th, 1908.

of this renders it necessary to distinguish between tuberculin treatment and opsonic treatment.

There are three points to note about the failure of tuberculin on its first introduction. The original preparation did not consist of the whole bacillary substance in as slightly altered a form as possible, and hence did not conform in composition with modern vaccines, which are administered with the definite object of stimulating the production of protective substances in the blood. Next, being apparently given with the idea that if the patient could be got to stand a sufficient amount of it the disease would be vanquished, the natural anxiety of doctor and patient to attain this point led to pushing the administration of the remedy to a dangerous extent. Much the same thing happened in the history of the use of mercury in syphilis, and the result was similar. Mercury was at one time discredited for many years amongst a considerable section of the medical profession, and tuberculin was, after a few years' extensive trial, put on the shelf except by a mere handful of practitioners. The third point is that clinical observation alone did not suffice to reform the administration of tuberculin, but led rather to its general abandonment. Its reinstatement as an agent of great therapeutic value has been brought about partly by the laborious researches of the last few years into the formation of anti-bodies in the blood, and their rôle in the production of immunity to bacterial infections; partly by the efforts of Sir Almroth E. Wright, who had never given up the use of tuberculin, to control inoculations by devising means of testing their effects without relying on clinical observation alone. These efforts naturally took the form of attempts to measure the anti-bacterial or protective substances in the blood, whether of normal persons, of those suffering from bacterial diseases, or of the subjects of prophylactic or curative inoculations. These substances being of various descriptions—lysins, agglutinins, precipitins, bactericidal substances, &c.—their production can sometimes be followed by more than one test.

Wright's efforts to measure the effects of individual inoculations of tuberculin by estimating the increase in the agglutinating power of the blood serum for the tubercle bacillus, had already,

in conjunction with his researches on other bacterial vaccines, guided him, before his discovery of opsonins, to a more rational use of tuberculin, and had enabled him to make many striking cures of tubercular lesions in patients who had suffered from the older method of inoculation. When, in conjunction with Douglas, he revealed the existence in the blood of a hitherto unknown class of protective substances, Metchnikoff's insistence on the importance of phagocytosis in repelling bacterial invasions was soon placed in an unassailable position.

Briefly, phagocytosis—the ingestion of invading bacteria by leucocytes—is the common and generally the main defensive action of the organism. The leucocytes are powerless to effect this ingestion without the presence of opsonin in the blood, which opsonin is absorbed by the bacteria; and, further, the production of specific opsonins can be stimulated by the inoculation of suitable doses of bacterial vaccines.

Again, the opsonic power of the blood serum can be measured by Wright's method of determining the opsonic index, and it may be taken as definitely proved that this varies little in healthy persons, but undergoes great, and sometimes rapid, alteration in the subjects of infection. This is accounted for by the facts that opsonin is withdrawn from the blood in the process of phagocytosis, and is produced in response to the stimulation caused by the absorption of invading bacteria and their products into the blood stream. It is also produced by the inoculation of dead bacteria in the form of vaccines, and hence the effects of inoculation and of auto-inoculation are, at any rate in part, similar.

Opsonic treatment, therefore, has to take cognisance of the patient's condition as regards auto-inoculations, to either minimise them or utilise them when they take place, and to consider the desirability of supplementing or replacing them by inoculations of vaccine. To minimise them must always be the first effort, since large and irregular inoculations—auto or artificial—produce the result which it is the chief effort of the immuniser to avoid, viz. over-stimulation and a consequent prolonged fall in the production of protective substances. This is the so-called negative phase, during which an extension of the disease is

favoured. Rest and a reduction in the coagulation time of the blood (to which end the giving of calcium salts may supplement the milk diet) are the main factors in minimising auto-inoculation. Having attained this end, massage, or regulated exercise, or injections of tuberculin, may be used to induce controlled stimulations of the protective machinery. If tuberculin is used, exercise and massage should be prohibited at first, in order that the effect of the inoculations may be studied as nearly as possible without complications, and when later graduated exercise is prescribed, it should be done so as to supplement and not interfere with the injections. Drugs which hinder phagocytosis should be avoided as routine treatment, but iron, in the anæmic cases, and strychnine may be given for long periods.

Further, it is an essential feature of vaccine therapy that the blood must not only be charged with protective substances, but must be brought to the focus of infection in increased quantity if possible. In dealing with gross lesions of the limbs and superficies, one can accomplish this by cupping or bandaging according to the method of Bier. In phthisical cases the same result is said to be achieved by restricting the intake of air during inspiration, whilst expiration is made as free as possible. This can be done by closing the mouth and one nostril during prolonged inspiration only, or by the use of Kuhn's suction mask. In two or three of the cases cited below, breathing exercises on this plan were prescribed, and were apparently useful.

The taking of the opsonic index is employed (1) to assist in diagnosis; (2) to ascertain the condition as regards auto-inoculation; (3) to control the effects of tuberculin injections, of exercise, and of massage; (4) to keep a watch on the patient's condition after an apparent cure: and will be found useful in proportion to the experience which the operator has had with it.

But even were a case treated on the above lines without the taking of a single index, it would be in a sense opsonic treatment, since without the many thousands of determinations made by Wright and his pupils the principles above enunciated could not have been laid down. These have shown conclusively that in giving tuberculin by the old method—large doses rapidly increased

and at diminishing intervals—the opposite effects to the desired ones were certain to be produced.

These introductory remarks have been necessary to emphasise the difference between the ideas which govern the modern administration of tuberculin, and those which obtained on its first introduction, and we may hope that the remark, "Tuberculin was tried years ago, and did nothing but send up the temperature and aggravate the disease," will not be much longer used as a deterrent.

Another frequent reply to inquirers—"Tuberculin treatment is on its trial: we must wait until results on a large scale are available"—has an element of truth and caution, and I do not think anyone could be blamed for not advising tuberculin in phthisical cases whose previous experience with extra pulmonary tubercular lesions had not convinced him of its utility in a very decisive manner. My own conviction, based on the tubercular cases I saw in all stages of treatment at St. Mary's, that one could not employ tuberculin rationally in half a dozen successive cases of palpable tubercular lesions without encountering cogent evidence of its specific efficacy, was borne out in my own experience directly I was able to put it to the test.

One of the first cases was that of a man, H. T., with tubercular wrist, whom I showed at Bath in November 1906, half cured of a lesion involving the whole dorsum of the right hand and the ulnar side of the palm, discharging by three openings, with minute bone fragments occasionally coming away. For a year before treatment the hand, although at rest in a splint, had been getting worse and the pain increasing. Absolutely no change was made in the treatment, no medicine was administered, and there was no change of residence. The man came from Devizes to Bath at regular intervals to be inoculated, and has now for more than a year been using the hand in full work as a hedger, ditcher, and thatcher. Opsonic index before treatment 0.5, always higher since. Opsonic index of pus never higher than that of blood, generally lower, once or twice very low. There is no pain, all the movements are intact, and the cure is as nearly as

possible perfect, although inoculations are still being given at long intervals, as under heavy work or a little indulgence a drop of serum still makes its way out at one minute point.

Or take one of my last cases. A young cook came to me with a tubercular ulceration affecting the terminal phalanx of a finger. This, under simple dressings with boracic lint and the exhibition of medicines which are often useful in such lesions, had failed to heal in twelve months. (A younger sister was attending hospital with tubercular abscess of leg.) The index at starting was 0.63, and I commenced inoculations with the intention of using Bier's treatment also if necessary. Two inoculations, however, healed the finger within twenty days, no medicine being given and the dressings not changed.

A strict *experimentum crucis* is hardly realisable in medicine, for when all material conditions have been arranged so that the only one to be varied at will is the therapeutic agent under test, one has still to reckon with uncontrollable changes in the patient, with psychical influences and the possibility of faith cures. But it will be admitted that the two cases cited are as nearly crucial as possible, and that although such striking results only follow in a percentage of cases, they thoroughly justify the routine employment of tuberculin as a specific remedy. Nor could such cases fail to stimulate one to try cautiously whether, at any rate, some cases of pulmonary tuberculosis could not be found to respond to tuberculin in a similar unmistakable manner.

Proceeding tentatively, and prepared to drop altogether the remedy unless unequivocal instances of benefit should present themselves, I found it was not necessary to treat half a dozen cases before encountering such instances. The first two or three yielded evidence of the kind required, and I have brought them forward with others in this paper in chronological order, so that the impression made on my own mind may be reproduced in the reader's.

Without waiting for statistical comparisons of batches of similar cases treated with and without tuberculin, or in any way appealing to the experience or opinion of others, I am able to decide for myself, on a basis of experience available to every private practitioner, that in dropping the use of tuberculin I should

be depriving my phthisical patients of a remedy which may or may not determine or accelerate a cure in a given case, but cannot, so far as my knowledge extends, be replaced by any other having the same valid claim to specific action. The cases cited, although few in number, include almost all types of phthisis, recent and long-standing, acute and chronic, febrile and apyrexial, with and without hemorrhage, discoverable cavitation, or pleuritic complications, one and both lungs involved, etc. Some are apparently cured, and some may probably never be cured; but they all present the one feature essential to my argument—of certain definite and sometimes measurable improvements occurring under conditions approaching crucial ones, and therefore not admitting of probable explanation apart from the administration of tuberculin. The use which has been made of the opsonic index will appear in the notes of each case. The technique employed in its determination is that learned under Sir A. Wright, with the slight modification that I fix all my films by heat. The counting is done by my laboratory assistant, with no knowledge of the cases or circumstances. One hundred cells are counted in each slide, in two batches of fifty; these usually show close agreement, and the total is accepted. If not, another fifty are counted, and so on until it is considered the average is a fair one. Clumps, which are rare, are excluded from the counts. When one has in this way determined even a thousand indices, one knows the degree of accuracy to be expected from the method, its limitations, and most of the disturbing factors; and I am not aware that anyone with even this amount of personal experience has failed to obtain concordant results. To-day, for example, I sent down two samples of blood taken from the same patient at an interval of half an hour, the patient lying on a sofa meanwhile. They were marked I. and II. merely, and the indices returned were 2.20 and 2.21. The counts were: I.—First fifty leucocytes 80, second fifty 87, total 167; II.—First fifty 83, second fifty 85, total 168.

There are, of course, questions pending of the greatest interest with regard to the whole subject of opsonins and their estimation, but as they in no way affect the validity of any conclusions here

made use of, which are simply the most general ones emerging from the observation of some hundreds of cases, and the determination of certainly over 30,000 indices by uniform methods by Wright and his pupils, I need not discuss them. In default of being able to measure all the factors in the production of immunity, it is surely of great advantage to be able to measure, though laboriously and imperfectly, one of the chief, and this the opsonic method enables us to do, as matters now stand, better than any other suggested means.

Case 1.—H. R., æt. 9. First seen August 17th, 1906. Sixteen months before, this boy was sent for treatment to dispensary, where signs of phthisis were found in right apex. Under treatment and away from school weight rose from 41 to 47 lb. in two months. Again attended in April of 1906, weighing only 47½ lb. After four months' treatment weighed 49 lb. Slight cough and expectoration. It was then proposed to send him to the Union Infirmary for open-air treatment, but at the suggestion of a guardian I undertook to treat him by inoculation at home. I thought and said that although the lung might heal, he was too much of a weed to fatten. He was too tired to play about with other boys, dulness at right apex, a little morning cough with T.B. fairly abundant in sputum. He was kept on same medicine as he got at the dispensary, and on August 24th first inoculation was given, his opsonic index at the time being 0.35. The cough ceased after this first injection, and no further specimen of sputum could be got until September 17th, when he coughed up a very small quantity in the morning in which no T.B. could be found. Inoculations were continued about every fourteen days. After the second he felt very well, and began to play; in two months he gained 3 lb. and weighed 52 lb., felt perfectly well, and went for long walks with his father. Although inoculations were continued for four months longer, he made no further gain in weight. The index was taken several times, and never was so low as before the first inoculation. Soon after this he attended school, and now sells newspapers in his spare time. He comes up to me now and then to say he is quite well, but he has not gained (May, 1908) more than 3 lb. since inoculations were discontinued. The crucial points in this case are the diagnosis made by another medical man sixteen months before, confirmed by finding T.B. in sputum at time of commencing inoculation, and the rapid disappearance of all symptoms under tuberculin, *no other change in treatment being made*. So far from having faith in the hypodermic needle, every injection was given under protest, to an accompaniment of cries.

Case 2.—C. B. First seen September 13th, 1906. A young man of previous good health and physique, actively engaged in business. Three or four weeks before acute pleurisy followed by sign of rapidly extending mischief in right apex. Profuse sweats and high temperature, which had somewhat quieted down when I saw him. There were signs of cavity formation. Sputum and T.B. abundant. General condition good. Opsonic index on two successive days, 1.22 and 1.80; reduced by the first small inoculation to 0.52 in twenty-four hours, but recovering in a few days to 1.50. During this short negative phase an increase in the symptoms was observed, but an improvement then set in which continued throughout the subsequent course of inoculations with little or no interruption. The dose of tuberculin used on the first occasion was 1/2500 mg., and it is probable that a smaller dose would have been preferable. Seven inoculations were given at intervals of about three weeks, and fifteen indices were determined in connection with them. The patient was always very sensitive to tuberculin, the injections producing sharp falls in the index, succeeded by moderate rises of short duration, though in one instance an almost immediate rise was observed. On February 7th, 1907, T.B. had disappeared from the sputum, the opsonic index was 1.50, and heated serum index 0.39, the patient was up and about with a normal temperature, and feeling comparatively well. He was then sent to Torquay for change, and by June was still better. The index on May 10th, 1907, was 1.17, and on June 30th, 1907, 1.00. He increased in weight from 9 st. to 13 st. and the cough and expectoration disappeared, but there were still signs of consolidation, and some moist sounds audible in right apex. At present, a year later, there is no relapse. He has gone to Australia, and sends home encouraging reports. This gentleman was a patient of Drs. Lees and Holmes, and was seen by me once only. It was not possible to get clinical records complete enough to trace the effects of individual doses of tuberculin on temperature, weight and pulse. He was seen in consultation by Dr. Shingleton Smith at an early stage of his illness, and his condition then necessitated the gravest possible prognosis. The evidence the case affords for the usefulness of tuberculin lies in the improbability of such a remarkable improvement under ordinary treatment, and in the consensus of opinion—of the physicians, the patient, and myself—that improvement really followed the inoculations. The case was treated in an ordinary bedroom at home, with, for the first few weeks, absolute rest in bed, a strictly milk diet, and the administration of calcium chloride. Dr. Lees writes me :—" When opsonic treatment was commenced, the patient's condition was most grave, and he was going downhill as rapidly as possible. Dr. Shingleton Smith considered him almost hopeless, and the improvement was truly remarkable."

Case 3.—O. M., æt. 20. First seen March 13th, 1907. Strong young man. Designer in father's office. Weight in health, 10 st. 7 lb. Bronchial cough in October, 1905. Lungs examined by Dr. Edgeworth, and found sound. In good health then until January, 1907. January 21st, 1907: Dr. Herapath called in for what appeared to be an attack of influenza. January 31st: temperature continuing and lung trouble being suspected, Dr. Charles called in consultation. Sputum sent to Clin. Res. Ass. and T.B. found. February 12th: temperature and other grave symptoms continuing, Dr. Charles again consulted. Found fluid in chest and aspirated; also took sample of sputum. Examination of both negative as to tuberculosis. February 13th: Mr. Carwardine operated and withdrew 27 oz. cloudy and blood-stained fluid from pleural cavity. Temperature remained up after the tapping, and did not begin to fall until the first inoculation on March 17th, over a month later. Previously, I believe, another sample of sputum had been examined in London, and T.B. found. On March 13th I saw him and examined the sputum, finding T.B. in not great abundance. The opsonic index was 1.41, and there was marked dulness of upper half of left lung. Dr. Markham Skerritt was called in on March 16th to sanction the inoculations which I proposed. This he did, with the reservation that personally he would prefer sending the patient to a sanatorium. I gave the first inoculation on March 17th, and saw him again on March 25th; after that not until he came to Bath to see me on May 1st nearly well. Five inoculations in all were given, and the temperature, which had remained up for over a month after the drainage of the pleural cavity, commenced to fall immediately after the first injection (see chart), and fell regularly with each succeeding one until it became normal. Between the fourth and fifth injections the patient got up and about, and had sub-normal temperatures in the morning. The sputum was scanty throughout, and ceased entirely before the fourth injection. The pulse kept up, 104 to 120, weeks after the temperature had become normal. In May, 1907, he went into the country for a few months, and I saw him again on September 18th in first-rate health, weight 10 st. 12 lb., lungs apparently quite sound, hardly any discoverable difference between the two sides. He resumed work. Last week I heard from his friends that he is as well as ever. The only use that could be made of the opsonic index in this case was to ascertain that each dose of tuberculin did not produce too great a temporary fall, and that there was a recovery before the succeeding inoculation. The fourth injection showed a normal index before and a few days after, and on the complete subsidence of symptoms (except accelerated pulse), the index rose to 2.0. When again tested, five months later, it was normal.

Those who would explain the fall of temperature and progress of this case to recovery apart from the inoculations, must fall back either on the long arm of coincidence or the pleasures of hope. The possibility, but not the probability, of the first is admitted, but the argument loses weight with every succeeding case to which it is applied. As to the second, if admitted it would point to the advantage of injecting hope hypodermically along with tuberculin, thus laying stress on the immaterial, and reversing the famous advice of Voltaire, that if you wish to destroy a flock of sheep with incantations you should administer a suitable quantity of arsenic with them.

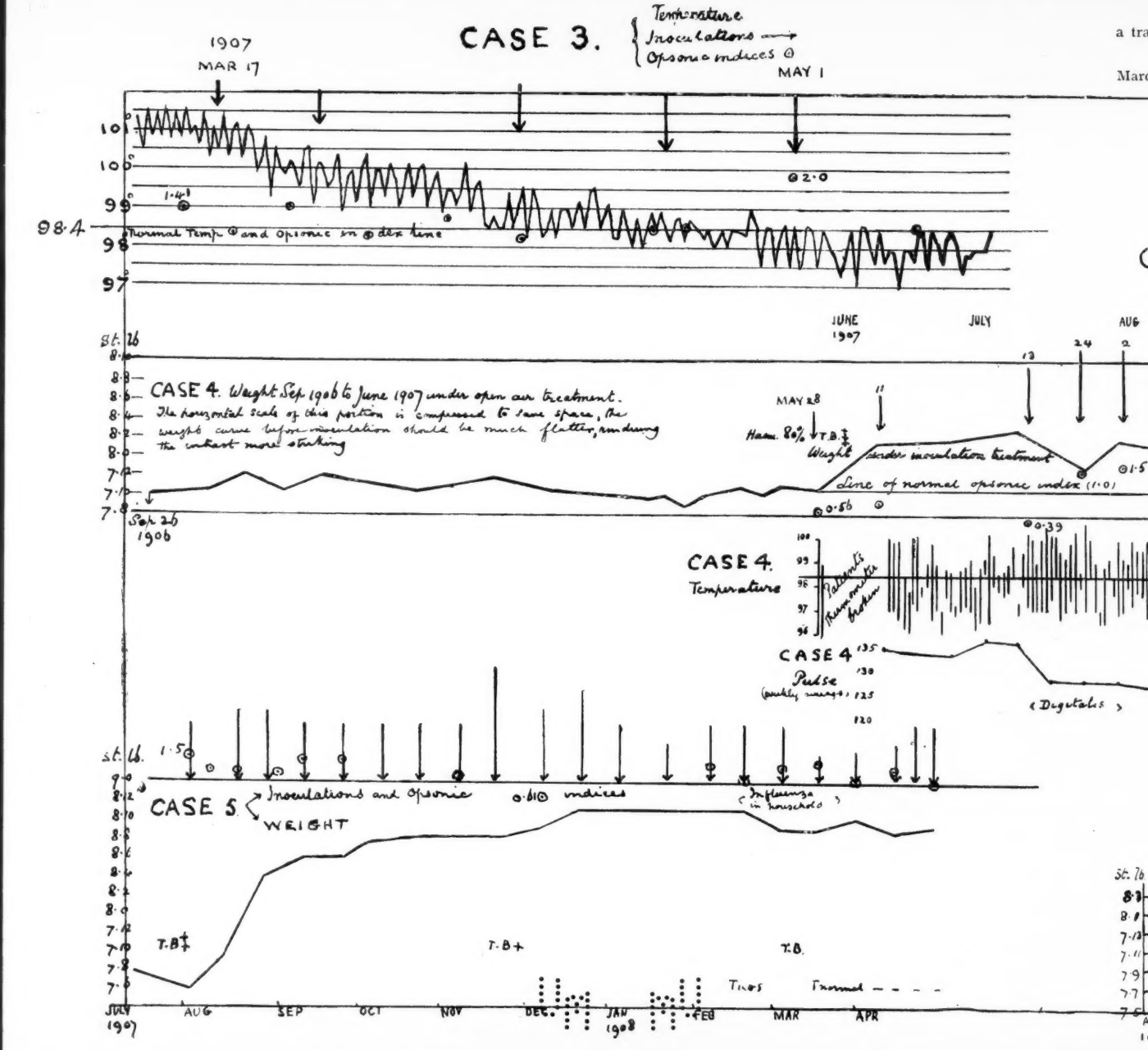
Case 4.—J. B. E., æt. 19½. Post Office employé. First seen May 29th, 1907. Nearly two and a half years before (Christmas, 1905) nasal catarrh, sore throat and cough. Under treatment by local doctor until March, 1906, when Dr. Markham Skerritt saw him in consultation, diagnosed phthisis, and gave a grave prognosis. Gave up work, and took to open air and milk. Had five weeks on a farm, and then passed his days in a hut which his father had built for him in the garden. March, 1906: weighed 8 st. 1 lb., probably never more than 8 st. 3 or 4 lb. Three weeks at Weston in August, 1906, during which lost 5 lb. in weight. Condition May 29th, 1907: Carries out the treatment with great strictness, but cannot increase weight even with forced feeding. Frequently vomits; has to walk with extreme slowness, supported. Exertion of getting into bed often brings on nausea or vertigo. Pulse 144, very weak. Nearly fainted during two or three of the early visits to me. Crepitations posteriorly over upper half of left and upper third of right lung, and in front at left apex. Whispering pectoriloquy near vertebral end of right scapular spine. Night sweats up to November, 1906. T.B. very abundant in sputum. I consented to try tuberculin in this case admittedly as a last resort, for the patient, an exceedingly intelligent youth, had rigidly carried out the best advice obtainable, and was practically under sanatorium treatment, with the additional advantage of a mother's care, and yet was losing ground. The parents were advised to discontinue sending him to me unless speedy improvement should become manifest, and considering the condition of his pulse, a sudden termination of the case during the first weeks would not have surprised me. He has now been under treatment a year, with the results depicted in the chart. Although recovery cannot even now be said to be probable, the difference in his condition is so marked that I consider the case the most interesting of the series. The first inoculations resulted in a gain of 5 lb. in weight in a fortnight, and as he had carefully kept his weight chart for eight months previously,

the point is a crucial one. The gain in weight has, on the whole, continued to be progressive, and he now stands at about the highest level yet reached. The temperature chart is even more satisfactory. To save space, the daily range is marked by vertical lines, and it will be seen that for some months past it has differed little from that of a normal man. The pulse has come down more slowly (as in other cases), but during the last few weeks has undergone remarkable improvement, simultaneously with what appears to be a rapid clearing up of the right lung. Commencing with a weekly average of 135 on two readings daily (at 10 and 6), it is now 109 on a weekly average of three readings daily (8 in bed, 10 up, and 6). The break in the pulse chart marks where the three readings system begins. Digitalis was given for a fortnight at an early stage, with a decided reduction in pulse rate, but it was badly borne, and, being open to other objections, was discontinued. Iron was given from the commencement, and the hæmoglobin has risen from 80 to 95 per cent. If it should be thought that iron is responsible for the initial crucial gain in weight, one has only to turn to the chart of the next case, where a much greater gain in weight occurred before iron was given. It was only practicable to determine the opsonic index once a fortnight, viz. at the moment of inoculation. Remembering that the journey to Bath, from some miles beyond Bristol, was the one bit of exercise of the fortnight, and was accomplished with difficulty, the use made of these testings was to be sure that the opsonic power was not depressed to a dangerous point before each injection. It would have been preferable to give the injections at his home, but no one on the spot would undertake it, and a six-cylinder motor-car, which would in this case have possessed decided therapeutic value, was not at my command. As the chart shows, the indices were almost always below normal, but only on two occasions were they too low. Each occasion is significant. The one on July 13th preceded the most serious set-back of the whole time (for which the extreme heat and the rather large inoculation must divide the responsibility), and that of February preceded another period of difficulty, coincident in time with the all-prevailing influenza, which seriously affected other members of the household. During this period the patient lost a little weight, and complained of pain in the right chest. After the passing of the influenza wave he rallied, in common with four other phthisical patients who were similarly and simultaneously affected, and has since progressed to the best condition yet attained. A minor set-back occurred in this and other cases during the very cold snap at the end of December. A timely doubling of all underclothing prevents loss of weight from this waste of heat by radiation solely, in patients of feeble assimilative capacity.

Case 5.—W. L., æt. 21. Telegraph engineer. First seen August 1st, 1907. Three and a half years ago had what was called influenza, in Rosario. Removed to Buenos Ayres, where he had a bad hemorrhage; none since. Came home, abundant T.B. in sputum. Remained home fourteen months doing open-air treatment, gained weight, and got better; T.B. disappeared from sputum. Went out again, but got relapse; was to have been sent to Cordoba, which is considered good for consumptives, but was sent to Mendoza instead. Became permanently deaf on left side after large doses of quinine. There got laryngitis and bronchitis, and came home again in June, 1907. Is still hoarse, with continual throat cough. Upper half right lung has increased vocal fremitus and resonance, with dry crepitations and dulness. The temperature seldom rises above 99, and is often 97–98. Has been losing flesh, and now weighs 7 st. 6 lb. The first inoculation was given on August 1st, and on August 27th he had gained 12 lb. in weight (see chart) and felt stronger, with diminshed cough and expectoration. The gain in weight continued, with intervals of marking time, but no relapse until February 17th, when influenza broke out in the household, and the patient, for the first time, developed a temperature of 100.5, and began to lose a little weight. Simultaneously the base of the right lung showed signs of consolidation, but T.B. disappeared from the sputum. Before this set-back the patient had every prospect of a quick cure; he felt strong, and could walk six miles without fatigue. After remaining weak for several weeks he has again picked up his weight and gained strength, but considering that a much larger area of lung is now involved, the prospect is more doubtful. This case allowed of much more exercise than the preceding, and of larger doses of tuberculin. The indices, taken always after journeys to Bath, are hardly ever below normal. Note that on November 18th, after the weight had remained stationary for over a month, an increased dose of tuberculin inaugurated a further rise.

Case 6.—L. C. First seen November 2nd, 1907. This young lady had rales in right apex, with slight temperature and T.B. in sputum nearly seven years ago. At once sent to a sanatorium for eight months. Much improved; 7 st. 12 lb. on entering, 9 st. 10 lb. on leaving (13 lb. were gained in first fourteen days on forced feeding). Temperature normal or sub-normal on leaving; 99–100 on entering. Still a little cough, and some T.B. in sputum. Soon had a relapse, and has been gradually getting worse, with considerable intervals of improvement. Open-air treatment followed throughout very intelligently and perseveringly. Was also some months at an Austrian cure. Slight hæmoptysis on several occasions. November, 1906, signs of a large cavity in right upper lobe. Again in sanatorium for nine months, during which time cavity apparently diminished

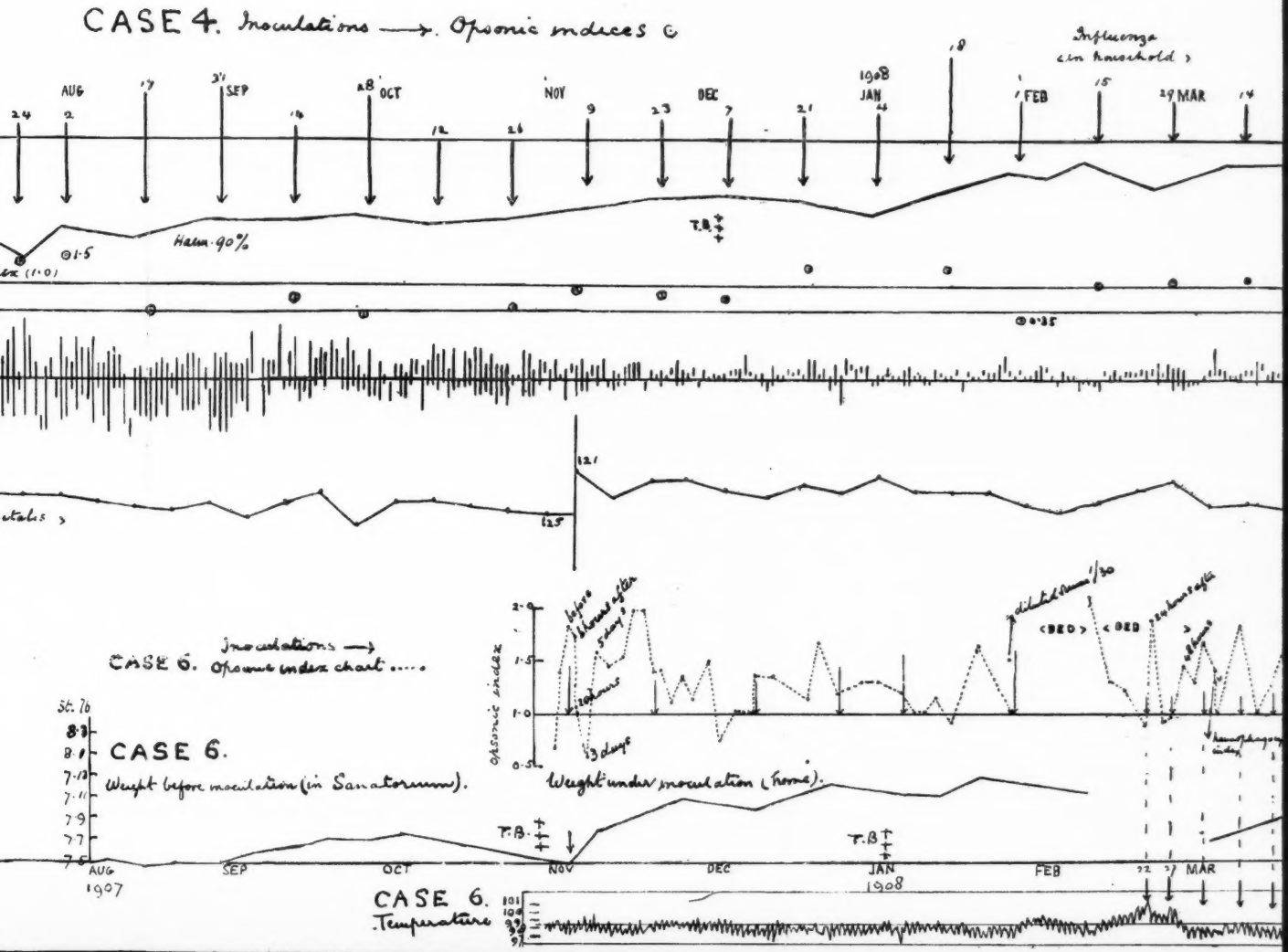
in size. Weight rose from 7 st. 1 lb. to 7 st. 12 lb. in three months, but declined again to 7 st. 5 lb. in next six months, when opsonic treatment at home was advised by Dr. Fraser, instead of a return to a sanatorium. November 2nd, 1907: T.B. very numerous; coagulation time, 3 min. 30 sec.; frequent epistaxis; hæmoglobin, 80 per cent.; signs of cavity under sternal half of right clavicle about size of a five shilling piece; moist sounds all over upper half of right lung at times, but they frequently disappear almost entirely. First sanatorium spoiled the appetite, which is now feeble and capricious, and any little gain in weight is soon lost. The weight chart for several months before inoculation is appended. There is again to be noted a crucial gain in weight directly the inoculations were commenced, continuing, with some variations, until the height of the influenza wave. The patient had on the whole made undoubted progress, when on January 25th she assisted in entertaining visitors at a crowded "At Home" (many of the visitors coming from influenza-infected households), complained of great fatigue, and almost at once took to bed with relapse in all symptoms. Up to this time exercise had been severely restricted, milk and lime water had been freely given, also calcium chloride (with the result of stopping the attacks of epistaxis), and the inoculations had been of average amount and at rather long intervals. There were unusual opportunities of studying the opsonic aspects of this case, and a great number of indices was taken, enabling one to make a probable curve (see chart). The index was before inoculation subject to great fluctuation, and affords a good example of what happens in these cases of systemic infection. Any three or four successive indices selected from the chart would afford good evidence of infection in a case where the diagnosis was doubtful. It is plain that the effects of individual inoculations are obscured by these natural fluctuations, and however many indices are taken, they do not serve as a guide to individual inoculations. But, on the whole, it is readily seen that no negative phase of even a day's duration has been encountered during the whole course of inoculations, for there are few indices below normal, and every one of them is succeeded by a much higher one on the very next occasion of testing. Wishing to obtain a better control, I kept the patient in bed fifteen days during her relapse, on milk and calcium chloride, and waited to see if the temperature would subside without inoculation. As it showed little tendency to do so, I gave a tiny experimental injection on the afternoon of February 22nd, and this was followed by an immediate drop in temperature and corresponding rise in the opsonic index. Another, on February 27th, produced a similar result, and since then the temperature has been more nearly normal than at any time before. Under the system of small inoculations frequently repeated, she has recovered ground quickly, gaining weight at the


CASE 3.
Temperature
Inoculations →
Opsonic indices ⊙
1907
MAR 17
MAY 1
10°
100°
99°
98°
97°
98·4
1·48
⊙2·0
Normal Temp ⊙ and opsonic index ⊙
JUNE
1907
JULY
AUG
St. 2b
CASE 4. Weight Sep 1906 to June 1907 under open air treatment.
The horizontal scale of this portion is compressed to save space, the weight curve before inoculation should be much flatter, rendering the contrast more striking
MAY 28
Haem. 80%
T.B.‡
Weight
under inoculation treatment
Line of normal opsonic index (1·0)
⊙0·56
⊙1·5
Sept 26
1906
CASE 4.
Temperature
Patient's Normal Temperature
⊙0·39
CASE 4
Pulse
(possibly wrong)
« Digestalo »
St. 1b.
1·5
CASE 5
Inoculations and Opsonic indices
⊙0·61⊙
« Influenza in household »
WEIGHT
T.B.‡
T.B.+
T.B.
Times
Normal
JULY
1907
AUG
SEP
OCT
NOV
DEC.
JAN
1908
FEB
MAR
APR

Charts of Cases 3, 4, 5 and 6.—The original chart was drawn on section paper, but in consequence of the section lines appearing too prominent a tracing was taken and a new block made.

In all the charts inoculations are shown by arrows, the length being proportional to the dose.

Since May 26th Case 6 has gained another 4 lb., and Case 4's pulse-rate is now below 107 weekly average. Case 5 has regained much of the st March, and again takes 6-mile walks. (June 16th, 1908)



rate of 1 lb. per week for ten weeks, and now stands at record weight for four years, and feels correspondingly better The chest signs are better than at any time since inoculations were started. It is noteworthy that the opsonic index has been much more consistently high under this plan, which appears to suit this patient admirably. The activity of the patient's leucocytes was tested on one occasion by Veitch's plan for taking the hæmo-phagocytic index, and found to be good. Except for this purpose, the method seems to offer no advantage to one in the habit of regular opsonic work. On another occasion the dilution method was used, but it brought out no very great difference between the patient's and normal blood, and could seldom be used on account of the vastly greater labour.

Case 7.—C. E. P., æt. 34, tailor. First seen December 21st, 1907. Two months' cough with expectoration, but since fifteen years old subject to hoarseness and impaired voice on slight cold or over-exertion. T.B. had been found in sputum. Advised by doctor, on diagnosis of right apical phthisis, to give up business and go abroad to a sanatorium. Impossible. Applied for admission at Winsley; after an interval accepted, but no bed vacant. Feels as strong as ever. Sleeps well, but not so well owing to cough. Has only lost 2 lb. in two years—now 8 st. 10 lb. Appetite good. Two night sweats recently. No hæmoptysis or diarrhœa. Voice weak and hoarse. Pulse, 68; temperature, 97.2; hæmoglobin, 95 per cent. Some dulness right and left apices front. No rales. Breath sounds almost normal. Inspiration, 32 in.; expiration, 30 in. Foul sputum, with many T.B., long streptococci and staphylococci. Opsonic index, 2.0. First inoculation made him feel worse for two days, then suddenly better. After three inoculations did not feel that there was anything to consult me for. Voice natural, better than for two years past; sputum less than half, but T.B. abundant. By March 18th had increased weight to 9 st. 2½ lb., fell on April 22nd to 9 st., since increased to 9 st. 3 lb. on May 6th. The busy time and the influenza weather have tried him lately. Here is a case running an almost normal temperature, with normal pulse, no considerable loss of weight or loss of appetite or strength; in fact, nothing *chartable* on which to found a decided judgment as to the action of tuberculin. Opsonic indices were taken regularly every fortnight, but after the first highly significant reading (2.0) have only varied between .80 and 1.22. As to chest signs, on first examining him, I felt somewhat in the position of the aged and slightly deaf consultant, who was called in to a case of pneumonia, and whispered to the family doctor on the stairs, "Which side is it?" As I had given the sputum to my assistant to stain before commencing the examination, and inspected the T.B. before its conclusion, I was able to speak with certainty as to the diagnosis, in spite of the almost total absence of physical signs. The increase in

weight after inoculation, though adding force to the similar cases, is hardly crucial, but the unmistakable improvement after three inoculations may be considered crucial, though not chartable.

If tuberculin can show distinct evidence of specific action in serious, acute and longstanding cases of phthisis like the few here cited, cannot much more be expected of it in very early and slight cases? Where the diagnosis is clearly established, it seems to me it should be the very first means used after the patient has been placed under suitable conditions; and as the essentials of rest, fresh air, and good feeding can generally be obtained outside a sanatorium, I believe that tuberculin without a sanatorium can do more than a sanatorium without tuberculin.

Finally, there are the very numerous cases of children and young people beginning to ail who ought to be in perfect health. The family doctor suspects a tubercular tendency, or "delicacy of chest," but no unimpeachable symptoms are discoverable. If, however, there is a group of suspicious little facts, explicable by incipient tuberculosis though not diagnostic of it, and if a series of three or four opsonic indices (two of which may advantageously be taken before and after exercise respectively) shows the fluctuations so often met with in actual infections, it will probably be found that a few inoculations will at once establish the diagnosis, and cure the patient. Several cures of this kind have come under my observation, during the two years I have acted on the obvious indication.

CALMETTE'S OPHTHALMIC REACTION IN TUBERCULOSIS.*

BY

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ABOUT the middle of last year von Pirquet[1] made a communication to the Berlin Medical Society, in which he pointed out that when tuberculin was injected hypodermically three reactions

* Read at the meeting of the Bristol Medico-Chirurgical Society, May 13th, 1908.

occurred. (1) A general reaction characterised by pyrexia, (2) a local exacerbation in the tuberculous foci, and (3) an inflammatory hyperæmia along the track of the needle. The last gave rise to what is termed the "cuti-reaction," in which a 25 per cent. solution of Koch's "old" tuberculin was applied to the scarified skin, much after the manner of ordinary Jennerian vaccination. In September he published a list of 100 cases (in children), in all of which the positive reaction (*i.e.* the appearance of a papule at the site of vaccination) had been obtained, and in all of which an autopsy showed the presence of tuberculous lesions, with the exception of one case, in which, however, old pleural adhesions were found.

Mainini,[2] who has tried von Pirquet's reaction in 208 cases, finds that a positive result is more frequently obtained than in the case of Calmette's ophthalmic reaction. This he explains by supposing that healed tuberculous foci respond to the former and not to the latter method.

Von Pirquet,[3] in a later communication, gives details of 300 children, some tuberculous and some not. 88 per cent. of the obviously tuberculous gave positive reactions, the remainder being severe cases of meningitis, etc. Of 109 apparently non-tuberculous infants, only two gave a positive reaction, but among similar children, aged 8 to 14 years, 35 per cent. responded.

Feer, who has recently extended and confirmed von Pirquet's results, also notes that the test is not applicable to adults, as the percentage of positive reactions increases with the age of the patient. He and others also state that in severe tuberculous infections, shortly before death, no reaction can usually be obtained. The view of most observers is that von Pirquet's reaction is a useful test when positive in young children, but that its absence cannot be taken definitely to exclude tuberculosis, while its presence may only indicate a healed lesion.

Calmette's modification of von Pirquet's cutaneous reaction is now too well known to need detailed description. It has now been largely tested both on the Continent, in America, and in this country. Mr. Sydney Stephenson was, I believe, one of the first to publish his results in an English journal, his series of over

30 cases appearing in the *British Medical Journal* of October 19th, 1907.

At the conclusion of his paper he notes that, following Calmette's own directions, he used the specially prepared tuberculin which is sold for the purpose. This consists of a 1 per cent. solution (or probably a suspension) of the dead bodies or fragments of tubercle bacilli in distilled water. The bacilli are obtained from ordinary tuberculin by precipitation with alcohol.

Calmette considered that the glycerin or the carbolic used in preparing Koch's tuberculin would irritate the conjunctiva and cause errors in the result.

MacLennan,[4] with a view of testing this, made seventy observations on Calmette's tuberculin—twenty-five with Koch's old tuberculin, and ten with the new tuberculin. The last-named preparation in 1 per cent. solution was found to give doubtful and unsatisfactory results, but with the old tuberculin (1 per cent.) MacLennan found the results obtained were the same as those with Calmette's special preparation. This is apparently borne out by the experience of German authors, who have largely employed Koch's original preparation. MacLennan has also instilled 1 per cent. solutions of glycerin and carbolic acid into normal eyes without obtaining any reaction, and these percentages are probably the maxima for Koch's T.A.

It is hardly surprising that Koch's T.R. should fail to give conclusive reactions, seeing that it is a much milder preparation than the old tuberculin, and that when used hypodermically it produces only a general, and no local reaction.

After Calmette's original paper was published, several observers tried to improve on his method by classifying the reactions obtained according to their severity. Webster and Kilpatrick,[5] however, as the result of observations on 123 cases, came to the conclusion that no relationship could be shown to exist between the severity or duration of the reaction, and the extent or activity of the tuberculous process, as evidenced by the physical signs in the chest and the pyrexia. Smithies and Walker,[6] who tried the test on 242 individuals, came to a similar conclusioh,

Gulland and Williamson,[7] who report 28 cases, whilst noting that the time of onset varies more than is usually supposed, could determine no relationship between the age and condition of the patient, the state of the lungs, and the activity of the process on the one hand, and the severity of the reaction on the other. Wolff-Eisner and Teichmann,[8] however, have attempted to show that the type of reaction may have some prognostic value. They regard a brisk reaction, reaching its height in from twenty to twenty-four hours, keeping high the second day, and subsiding finally at latest on the fourth, as indicating a favourable condition for cure. They state that this type occurs in early cases, and in those in the first and second stage, and indicates a vigorous reaction on the part of the organism against the disease.

On the other hand, Stephens[9] thought that cases in which the lesions were early or healed reacted sluggishly; sometimes there was considerable delay. He admits, however, that some advanced cases also showed a delayed reaction.

Heywood[10] remarks that in advanced cases a negative reaction generally means a hopeless prognosis.

Delayed reactions sometimes occur. Smithies and Walker observed 6 cases of very slight or delayed reaction in their series. Some of these cases, when again tested, gave a severe reaction. A similar incident was reported by Eyre, Wedd and Hertz,[11] in their series of 138 individuals. I shall discuss the general question of the significance of second reactions later on.

General symptoms, pyrexia, malaise, etc., are but seldom observed. One such case occurred at the Children's Hospital out of thirty-two individuals. Woodcock[12] observed pyrexia in 2 out of 200 cases, and many cases of headache without pyrexia. Audeoud,[13] contrary to most observers, believes that slight pyrexia (1° C.) is the rule. Eisen,[14] out of 82 cases, noted pyrexia in 2, which, curiously enough, were both negative reactions. Webster and Kilpatrick observed 7 cases of pyrexia in 123 patients submitted to the test.

Another curious occurrence which occasionally takes place is a recrudescence of the ophthalmia. One of the cases in the Children's Hospital developed a second attack of conjunctivitis

seven weeks after the instillation, and five weeks after all signs of the first inflammation had passed off.

Long[15] points out that the reaction is occasionally bilateral. The reaction in the second eye was observed in 2 out of 40 cases, twenty-four and forty-eight hours respectively after the instillation. This phenomenon appears to be due to some accidental transference of the material from one eye to the other.

Calmette's reaction has been described as harmless and safe. This, however, is not absolutely the case. The literature shows that in a certain proportion of cases serious, or at least inconvenient, results occur. It is, of course, of importance to remember that any kind of conjunctivitis is a contra-indication for the test, as not only does it become difficult in some cases to determine whether a reaction has taken place or not, but in others the condition may be very seriously aggravated. Smithies and Walker, however, are of opinion that the instillation of Calmette's tuberculin does not of itself aggravate a pre-existing conjunctivitis.

Comby[16] holds that both eyes should be normal if the test is to be satisfactorily applied, but Brunetière[17] advises that in the case of disease in one eye, the other may safely be instilled with Calmette's preparation.

As to patients with definite disease of the eye, I have been able to collect the following observations from the literature.

Lapersonne[18] notes severe reaction in 6 cases; in all but one of these there was a pre-existing lesion. The cases included 2 of irido-cyclitis. In none was there any permanent impairment of vision.

Walker[19] reports 3 cases of ocular disease which reacted severely. In one of these a phlyctenular ulcer appeared on the cornea, which healed, however, without scarring.

Brunetière reports one case of phyctenular keratitis following Calmette's reaction, which he thinks may have been a recurrence, independent, more or less, of the tuberculin instillation.

Ramsay[20] reports a violent reaction leading to permanent corneal opacity in a patient who was obviously tuberculous.

At the time of instillation there was a slight nebula in the cornea of the eye, while the other eye had a superficial vascular ulcer, which healed up under injections of tuberculin.

Waldstein[21] states that a violent reaction may occur in follicular conjunctivitis, or even in ordinary catarrh.

Woodcock reports severe reactions in cases presenting ocular lesions, and Brons[22] has reported 5 similar cases.

Knapp[23] has noted interstitial keratitis after Calmette's reaction.

Even cases in which there has been ocular trouble in the past may give rise to severe reactions. Thus Eisen, out of 73 cases, noted 2 severe ones in which there was a history of ophthalmia in childhood. Wiens and Günther, among 47 cases, reported 3, in one of which there had been conjunctivitis, and Comby noted one similar instance. Kalt[24] reports on an old tuberculous lesion which was apparently lighted up again by tuberculin instillation.

On the other hand, Stephenson has reported on 30 cases of his own, and 21 of French authorities, without any mishap. Truc, the professor of ophthalmology at Montpelier, observed no bad results among 23 eye patients.

Reports on cases in which severe conjunctivitis appeared without any previous ocular lesion include 5 out of 30 examined by Collin;[25] in 5 or 6 noted by Butler[26] there was iritis and chororiditis; and Heywood noted one case in which the symptoms only slowly cleared up after six weeks.

Feer[27] considers that scrofulous children often react severely, and Delorme[28] has collected 39 cases of conjunctivitis from the literature. Napier[29] notes two curious cases in which, after Calmette's test had been applied, the injection of Koch's T.R. produced severe local reaction. MacLennan has also noted a tendency to recrudescence on injection with T.R. Epstein has reported 2 cases of phlyctenules, and one case of slight keratitis in children, and Mackay[30] an ophthalmia in a woman lasting ten weeks.

Though, no doubt, this does not by any means represent the total number of cases in which untoward results have taken

place, yet, considering that the number of times in which Calmette's test has been made now reaches some tens of thousands, it would not appear unfair to conclude that such accidents as keratitis or phlyctenular ulcers are very rare, especially when both eyes are healthy, and there is no history of antecedent eye affections.

It was owing to the fact that in two cases a prolonged reaction (eight to ten days) occurred that Comby substituted a 5 per cent. for the 10 per cent. solution recommended by Calmette. Feer, however, regards a 5 per cent. solution of T.A. an uncertain re-agent, and has, moreover, observed one case of phlyctenular ulceration under its use. MacLennan takes the same view as Comby, but quotes Oliver and Terras[31] as stating that only 1 in 150 in adults of Calmette's tuberculin gives doubtful results. Heywood considers that 5 per cent. is in some cases too strong a solution for children.

Calmette's reaction, like that of von Pirquet, does not usually occur in very advanced cases. Comby has obtained a reaction in moribund cases, and also during all stages of such a severe infection as tuberculous meningitis. It differs from that of von Pirquet in not responding when absolutely quiescent foci of disease are present, and it is this which gives it its practical usefulness in adult cases. Patients probably susceptible to tuberculosis do not react. Calmette[32] obtained negative results with the infants of twelve tuberculous mothers.

Animals susceptible to tuberculosis apparently react very similarly to man. Thus Campbell and White,[33] using Koch's T.A. and not Calmette's preparation, found that among twenty cattle the results were the same as those obtained by tuberculin injections. The more advanced cases, however, reacted less markedly. Calmette's reaction appeared to have one advantage over tuberculin injections in cattle. The latter cannot be repeated, as subsequent injections are always negative, whereas Calmette's reaction can be taken after a tuberculin injection, and yet give a positive result. It may, therefore, be used to check fraudulent owners who inject their cows in order to protect them against any subsequent application of the tuberculin test.

Variations in the severity, and even in the occurrence of the reaction occur, and these have been explained as depending on a positive or negative phase in the individual. Eyre thinks that a negative phase, somewhat prolonged, occurs after an instillation. He has not, however, made any exact observations on this point.

As to the reliability of the test, it appears that while in certain cases it has been shown to be erroneous, in the majority it gives an accurate result.

In support of the first of these propositions may be quoted Serafini's[34] observation: 3 certain though mild cases of tuberculosis failed to react. Engel and Bauer[35] obtained a positive reaction in an infant under twelve months old, in which no signs of tuberculosis could be found (*post-mortem*), and the same result was obtained in 4 others who later on failed to react to a diagnostic injection of tuberculin. Chauffard[36] has recorded a case of chronic appendicitis in which a negative result was obtained, but which at a subsequent operation was shown to be tuberculous. Blum,[37] out of 5 negative cases, found tuberculous lesions in 4 (*post-mortem*).

Kraus, Lensenberger and Russ,[38] among 7 negatives, found no traces of tuberculosis in 2 (*post-mortem*), old apical scars in 2, and calcified bronchial glands in 1. Massary and Weil[39] have recorded a case of generalised carcinoma in which a positive reaction was obtained, but no traces of tubercle could be found at the autopsy.

Besides these cases, there are now many cases recorded of enteric fever, scarlet fever, etc., which have given positive reactions both in the pyrexial and apyrexial stages. The absence of an autopsy, however, deprives this evidence of some of its weight.

I have constructed a table from the literature, to which I have added the cases observed by my colleagues and myself at the Children's Hospital, the total number of individual cases reaching 4,478. The cases are arranged in three columns: those clinically tuberculous, those clinically non-tuberculous, and those clinically doubtful.

Author.	Clinically Tuberculous		Clinically non-Tuberculous.		Clinically Doubtful.	
	+	−	+	−	+	−
Calmette and others	63	—	—	52	—	—
Grasset and Raimbault ..	7	1	1	14	5	3
Derchend	7	—	—	13	1	—
Prouff	9	—	—	6	3	—
Des Plats	4	—	—	5	—	—
Helipré and Hue	14	—	—	8	—	—
Grillot	7	—	—	2	—	—
Desbonnets	2	—	—	2	—	—
Letulle	81	3	—	27	—	—
Montegnon	12	2	—	8	5	—
Aubaret and Magne	11	—	—	—	3	1
Smithies and Walker ..	176	9	2	186	—	—
Mantoux	—	—	16	184	—	—
MacLennan	54	5	16	9	9	3
Kirkpatrick and Webster ..	79	22	—	2	—	18
Stephens	88	16	—	—	—	2
Woodcock	5	2	3	—	—	—
Parkes Weber	—	5	5	—	—	—
Mielle	11	—	—	7	—	—
Grünbaum and Austin ..	18	2	—	52	—	—
Eyre, Wedd and Hertz ..	63	2	—	63	—	12
Schröder and Kauffmann ..	43	5	12	8	4	5
Lenhartz	33	4	4	7	24	40
Cohn	60	26	10	182	23	9
Citron	25	6	1	44	11	3
Köhler	161	8	—	—	5	—
Eppenstein	60	25	4	69	38	51
Baldwin	50	3	16	41	8	18
Métraux	14	1	2	40	9	2
Schenk and Seyffert ..	27	1	26	26	15	5
Audeoud	12	1	—	15	1	2
Franke and Ratjen	6	—	4	29	9	3
Eisen	23	22	5	23	4	5
Comby	10	—	—	8	—	—
Necker and Paschkis ..	42	—	—	22	—	—
Plehn	—	—	17	15	—	—
Rosenan and Anderson ..	—	—	—	12	—	—
Levy	34	7	6	235	32	22
Zaniboni	32	—	—	17	—	—
Bandler and Kreiblich ..	22	4	22	15	—	—
Engel and Bawer	—	—	5	—	—	—
Mainini	11	1	8	42	26	14
Truc	4	—	—	—	—	19
Chauffard	—	1	—	—	—	—
Wiens and Günther	6	5	7	26	2	4
Klevienberg	8	9	—	—	—	—
Blum	—	—	7	181	34	190
Kraus and others	21	5	11	1	—	—
Bourget	—	—	2	—	—	—
Massary and Weil	—	—	2	—	—	—
Bristol Children's Hospital ..	4	1	—	19	4	4
Total	1419	204	214	1931	275	435

Out of 1,623 cases in the first class, 1,419, or 87.4 per cent., gave a positive, and 204, or 12.6 per cent., a negative result. In the second class there are 1,931 cases, of which 214, or 11.1 per cent., were positive, and 1,717, or 88.9 per cent., negative. In the third class, out of 710 cases 275, or 38.7 per cent., were positive, and 435, or 61.3 per cent., were negative.

The figure 87.4 per cent. seems somewhat low for the positive results among clinically tuberculous cases. It must, however, be remembered that among the negative cases occur a certain number of cases of healed phthisis which are clinically counted as tuberculous, and also a considerable proportion of very severe or moribund cases, in which Calmette's reaction is usually, though not always, negative. If such were excluded, the proportion of successful results would be higher, and it is in the earlier cases that this test finds its sphere of usefulness clinically.

Smithies and Walker classify the possible sources of error under five headings: (1) Failure in technique; (2) Differences in the preparation of the tuberculin; (3) Clinical errors and difficulties in diagnosis; (4) Errors due to different views as to what constitutes a positive reaction to Calmette; (5) Our general ignorance as to possible modifying factors.

No doubt if these various sources of error could be eliminated, the percentage of accurate results reported would be higher.

The causation of Calmette's reaction, from the pathological point of view, is an interesting and somewhat obscure problem. It belongs to a class of phenomena which depend on the condition called in German *ueber-empfindlichkeit*, or over-sensitiveness. The Americans call it anaphylaxis; and in England, with our usual disregard of philology, we generally call it hypersensibility. The ordinary reactions to tuberculin and mallein are well-known examples of this condition, which is not confined, however, to bacterial proteins. A guinea-pig, for instance, injected with $\frac{1}{250}$ cc. of normal horse serum, is rendered so over-sensitive, that after an incubation period of ten to twelve days a second injection is usually fatal. The reaction sometimes observed in man after the injection of diphtheria antitoxin has a similar incubation period, and is probably of a like nature.

These various reactions are all specific, and are followed by a species of immunity, called by von Pirquet " allergie."

With regard to Calmette's reaction, Wassermann explains it by saying that it depends on the fact that the tissue cells, which have under the influence of the infection developed antibodies, can perform their function more rapidly and intensely under the influence of a very small dose of the poison, than cells which have never been called upon to react in this way at all. They are thus in a condition of over-sensibility towards the antigen.

That some local condition of over-sensitiveness is produced is shown by the fact that a second instillation of tuberculin into the conjunctival sac is in most cases positive ; at any rate, it is so frequently positive, even after the first injection has been negative, as to give it no clinical value. Smithies and Walker think that the soluble toxins absorbed by the conjunctival vessels give rise to the local production of tuberculo-tropic substances such as opsonins and lysins, which in their turn act on the bacillary bodies lying enmeshed in the tissues. These are then broken up, and irritating endotoxins are liberated which cause an inflammatory reaction. In non-tuberculous individuals the cells are not sensitive enough to respond with lysin or opsonin formation on absorbing the soluble toxins. The only thing that strikes one about this explanation is that it sounds almost too ingenious.

For practical clinicians the moral of Calmette's reaction is that there is no short cut to diagnosis, unless it be that made by the surgeon's knife when he opens the abdomen, for instance, and finds acute hemorrhagic pancreatitis.

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SOME NOTES ON THE TREATMENT OF HÆMOPTYSIS IN PULMONARY TUBERCULOSIS.

BY

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HÆMOPTYSIS in pulmonary tuberculosis is more than a sign of a disease, in that it requires treatment on its own account over and above the treatment required for the disease of which it is a sign. It requires treatment on its own account because it may help in the spread of the disease in the lungs, because the loss of blood may seriously weaken the resistance of the patient, because it may cause death by loss of blood or by suffocation.

I do not intend in these few notes to cover the whole ground of the subject, but merely to speak of one or two points upon which many of the standard text-books are silent or dismiss with a passing note.

We may roughly divide cases of hæmoptysis into three groups, according to severity. Into moderate hemorrhage, where the blood is mixed with the sputum ; comparatively free hemorrhage, where blood is brought up alone and in quantity, but does not immediately threaten life ; and profuse hemorrhage, immediately threatening the life of the patient.

The first group is a very tempting one for discussion, but I shall confine myself to making one observation upon it. It is generally considered that even slight staining or streaking of the sputum with blood means that direct extension of disease has caused the rupture of a small blood-vessel, this rupture being due to the breaking down of degenerating tissues in which the vessel lies. That this is the more common cause I readily admit, but there is another source that is a lesser cause of anxiety, and a cause more frequent in sanatoriums than elsewhere. This form

of hemorrhage arises from the granulations covering some healing surface. Healthy granulations in other parts of the body have a tendency to bleed upon the least provocation, both from the delicacy of the walls of the new blood vessels and the friability of the newly-formed supporting tissues, and it is not difficult to understand how coughing causes, in similar granulations in the lungs, the slight injury required. We all know of cases where everything has been progressing most favourably for some months, when suddenly a small and apparently trivial hæmoptysis has so distressed the patient as to cause a serious set-back in the patient's general condition, apart from any increase of disease in the lungs. The chief value of the recognition of this cause of hæmoptysis lies in the fact that we may, in these cases, give the patient a simple and satisfactory explanation of the cause of their disquieting symptom, no small boon in a disease where the mental condition has such a profound effect upon the physical.

I may mention in passing, the slight aching pain and the dull pain on coughing that is sometimes caused by the dragging of hardening fibrous tissue upon the pleura. A recognition of this cause, and its explanation to the patient, may often be the means of sparing him much brooding and depression. We must not allow a really harmless symptom to do the patient harm.

In those cases where there is comparatively free hemorrhage unmixed with sputum, but with no immediate danger to life, there are well recognised lines of treatment, or "text-book" routine, in regard to which I wish to draw attention to two points: the danger of morphia, and the importance of posture.

This form of hemorrhage is sometimes followed by a spread of the disease, but we must be careful not to jump to the conclusion that there has been such spread solely on the ground that the hemorrhage has been followed by a rise of temperature for some days; nor must we too hastily conclude, as an alternative, that an increase of the disease has been the cause of both hæmoptysis and temperature. A rise of temperature is often caused by the absorption of effused blood in other parts of the body, for example

in the abdomen after injuries, or in the alimentary canal after gastric hemorrhage, and there is no improbability in the view that blood absorbed from the lungs causes a similar temporary rise in the temperature. Although it may often be difficult to distinguish at first a rise in temperature due to extension of disease, it is not difficult to distinguish it from a non-tuberculous broncho-pneumonia, a condition that may follow a hemorrhage.

The presence of blood in the bronchioles and alveoli is a source of danger quite apart from its interference with respiration. It is a foreign substance, it is an unresisting pabulum for micro-organisms, and it may carry bacilli to uninfected parts. But these obvious points are often forgotten. In the first treatment of this type of case the sheet anchor has been morphia. It soothes the fears of the patient, quietens the action of the heart, and lessens the reflex cough. Instead of a restless and terrified patient with palpitation and continual cough, with expectoration of bright fluid blood, we have a quiet and fairly calm individual with a moderate pulse, who coughs far less and brings up less blood. Those who have once seen this change are only too liable to use the drug in a case of less severity.

I can best explain my objection to the routine use of morphia by giving the outline of a case where the bad effect of morphia was strongly impressed upon me.

The patient was a young man who had lived hard and suffered from excesses of various kinds, during which he had, many years before, contracted syphilis. He came uuder my care for a slight hæmoptysis, which soon ceased under treatment. He had had, during the previous five years, some three or four attacks of profuse hemorrhage, that had not been followed by any remarkable disturbance of health. There were slight but definite signs of an old lesion at the right apex, and there were no signs of its activity beyond the hemorrhage.

Some twelve months later I saw him again, suffering from a moderate hæmoptysis, and at this time a tertiary ulceration appeared upon the penis.

He was vigorously treated with potassium iodide and mercury, and the ulceration healed rapidly and the hemorrhage

stopped. During this attack the blood was seen with the laryngoscope to come by way of the right bronchus. There was no expectoration beyond the blood, and although several examinations were made, no tubercle bacilli were found, and there were no alterations in the physical signs. Some months later I was called to see him in an attack of hæmoptysis, in which he had already brought up some half-pint of blood, and was in great mental distress, which I was unable to alleviate. I gave him ¼ gr. hypodermic of morphia. At this time he turned over on to the left side, and the cough and expectoration of blood having greatly diminished, he went to sleep in an hour or so. Unfortunately the blood was not examined for bacilli at this time, and I may here mention that in my experience blood free from other expectoration in cases of phthisis gives a negative result far more often than a positive when examined for bacilli. After this attack there was considerable oscillation of temperature, and scattered tubercle appeared in the left lung at various points. Tubercle bacilli were then discovered in the sputum. He was sent to a sanatorium, where, in spite of the most able treatment, he did not gain ground. He had frequent attacks of hæmoptysis of a mild character, and had staining of the sputum for prolonged periods.

In the end he had a severe attack of hæmoptysis, for which he was given morphia. By some mischance he was allowed to lie on the right side in the dozing condition following the injection, and a few days afterwards he developed a tuberculous pneumonia upon that side, where previously there had been least disease, and from this pneumonia he died.

I have in my mind other cases where I suspect morphia of having helped in the extension of the disease.

But beyond interfering with the removal of tubercle-laden blood, there is another reason why morphia should be avoided if we can do so. It is probable that morphia lowers the resistance of the body against tubercle, and the note by Dr. John M. H. Munro at the end of this paper supports this view. A drug that lowers the activity of the phagocytes is not the drug one would choose to use at a time when there may

be a wide dissemination of tubercle bacilli in the air passages.

In many of these cases of intermediate severity the advantages and disadvantages of morphia must be carefully weighed. If possible it should be avoided, but when it must be given, then at least care should be taken that the after treatment assists in the removal of the blood as rapidly as possible by the free administration of drugs which dilute and increase the sputum. The cough that is caused by the increase of the sputum is nothing like so forcible or distressing as that caused by the thickened secretion that follows the administration of morphia, a thickening that is further increased by the removal of fluid by the bowel, and by lessening the intake of fluids by the mouth, that is to say, by the text-book secondary treatment for this form of hæmoptysis. I doubt much whether the attempt to reduce the blood-pressure by these means compensates, by its effect upon the pressure, for the decreased fluidity of the sputum.

Another point in the treatment of this type of hæmoptysis is the posture of the patient. The patient should be placed in a position as nearly horizontal as the necessity for expectorating will allow, but, above all, the patient should lie upon the side where the physical signs have proclaimed the greatest destruction of lung tissue. An argument frequently raised against the adoption of this position is that the hemorrhage does not necessarily come from the lung where there is most disease. This argument shows ignorance of the reason for which this position is adopted. It is not adopted in order that the effused blood shall remain in the lung where it arises, but lest any unexpectorated blood should remain in the lung where there is the greater amount of healthy lung tissue. Where there is more damaged lung there is less opportunity of doing harm to healthy lung.

The third group is a comparatively uncommon one, and it is still more uncommon for us to have the opportunity of treating it. It has been frequently stated, indeed I have but recently seen it clothed in all the impressiveness of the aphorism, that patients do not drown from hæmoptysis. I should not trouble to disturb

a merely theoretical heresy, but this theory has a dangerous bearing upon practical treatment. To confine one's attention to preventing the patient's death from loss of blood, whilst the patient is allowed to die from suffocation beforehand, is very one-eyed treatment. I have been actually present in only two of these cases, although I have come in shortly after the heart had ceased to beat in others, and in some of these cases the *post-mortem* conditions have convinced me that death was due to obstruction of the respiratory tract. I have seen a case where death was due to hemorrhage into enormous excavations in the lung, without there having been any expectoration of blood, the affected parts being entirely insensitive, and the source of the hemorrhage being also within this area, and I admit that there are many cases in which death is due directly to loss of blood, and this in a very short time.

In my experience of the third group, the patient sits up in an attempt to breathe more freely, and in so doing assists the process of drowning. The blood may be blown out with a gurgling, choking sound rather than coughed up, and the patient struggles in his attempt to obtain air, the blood rapidly fills the lower tubes and is aspirated into the alveoli, so that there is soon an insufficiency of air behind the blood to drive the blood out. This is obviously no time for prescribing morphia and ice to suck! The patient must be placed at once on a bed or couch, turned upon the face with the head and shoulders hanging well down over the side, so that the tracheal and bronchial drainage may be as free as possible. Amyl nitrite should also be given as an inhalation.

More vigorous treatment is essential where the patient has already been allowed to fill up his respiratory tubes with blood, and the respiratory movements have ceased or are ineffectual. The risk of increasing the hemorrhage is of small moment compared with the absolute necessity of freeing the trachea and lungs from effused blood. The position described should be adopted at once, or the patient actually inverted, and if the blood does not at once pour from the mouth, the chest should be forcibly compressed, and every endeavour made to free the air passages of

clots, and then artificial respiration resorted to until natural breathing is restored or the heart has irrevocably stopped.

Where a patient, in previous attacks of less severity, has been rightly treated with elaborate precautions against the least unnecessary movement, and when even the slightest percussion was tabooed, it requires courage to treat the patient energetically in a hæmoptysis of the utmost severity.

We may at times save a patient from drowning only to see him die from loss of blood, in which case it may be difficult to persuade the friends that although our vigorous treatment may have assisted the death from hemorrhage, the patient would certainly have died from suffocation if we had treated him otherwise ; in short, it may be difficult to convince the friends that we have given the patient his only chance.

NOTE.—Dr. John M. H. Munro has most kindly allowed me to add the following notes of some results of his research upon the influence of various drugs upon phagocytosis :—

At the November meeting of the Bristol Medical Research Club, in the course of a preliminary communication on the "Influence of Drugs on Phagocytosis," the following experiments with morphia were cited. Unweighed traces of morphia were dissolved in normal serum, the opsonic index of which was then determined in comparison with that of the same normal serum to which no morphia had been added. Using an emulsion of tubercle bacilli and making full counts of 100 leucocytes, the addition of morphia to the serum on five different dates reduced the number of bacilli ingested from 97 to 72, 118 to 52, 94 to 52, 68 to 29, and 77 to 52, thus reducing the opsonic index on the average to 0.56. Similar results are obtained when serum diluted with morphinated normal saline is tested against the same serum diluted to the same extent with pure normal saline. In the case of some other drugs, the index is very noticeably reduced when the amount added is under 0.25 per cent. of the serum, but in the case of morphia the results have not yet been accurately quantified. The action of the morphia is presumably on the leucocytes, but this requires proof.

SOME CLINICAL POINTS IN THE EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS.[1]

BY

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AN early recognition of pulmonary tuberculosis becomes more and more imperative as we realise the gravity of the disease and its ravages among all classes and conditions of men. The open-air movement in England has brought the subject of consumption into great prominence before the public and before the medical profession. During the last ten years of its inception it has roused the nation to see the serious nature of the disease, and has not only revolutionised its treatment, but has drawn a body of enthusiasts to give a closer study to the disease in its various aspects and symptoms. So that medical men are beginning to see that in order to fight consumption successfully, the disease must be recognised and treated in its very early stages. But what is an early stage? The term is so vague and so glibly used, that in its ample folds it hides a multitude of mistakes. The old classical division of pulmonary tuberculosis into first, second and third stages, rather than into consolidation, softening and cavity stages, has served its purpose in the past, but it is not accurate enough either for scientific diagnosis or for successful treatment. The main purpose of this paper is to call attention to the important fact that for early diagnosis and treatment we should from beginning to end depend almost entirely upon physical signs and symptoms, and that the trained ear of the physician could detect the presence of the commencing disease long before any other methods of diagnosis could possibly indicate it. Before beginning

[1] Read before the Bristol Medico-Chirurgical Society Meeting, January 8th, 1908.

to describe some of the early physical signs, I should like to say a word on some of the other aids to diagnosis that are in vogue among members of the profession to-day.

1. Chief of these aids is the presence of tubercle bacilli. Koch's discovery of the tubercle bacillus is an important landmark in the history of the diagnosis of consumption. The medical profession hailed the discovery with great delight and enthusiasm, and accepted it as the one sure tangible proof of the presence of the disease. It is not in the province of this paper to enter into a discussion of the relation of consumption to the tubercle bacillus. I said five years ago, at the annual meeting of the British Medical Association, and I repeat now, that there is a great tendency at the present day to exaggerate the importance of the tubercle bacillus in the causation, diagnosis and prognosis of pulmonary tuberculosis. Medical men so thoroughly believe in the tubercle bacillus as proof positive of the presence of pulmonary tuberculosis, that they are becoming more and more dependent upon the bacteriologist for their diagnosis, and wait for their decision till the sputum has made its appearance. The consequence is that by the time the tubercle bacilli are demonstrated in the sputum the patient has advanced well on the second stage, and hopes of an early arrest or speedy recovery are made increasingly difficult. Besides, there are conditions in which the bacillus cannot be found in the sputum. Tubercle bacilli cannot be found in acute pulmonary tuberculosis, in the early periods of the first stage of chronic pulmonary disease, in some of the cavity cases, or in later stages. In some children the bacilli cannot be demonstrated even if any expectoration can be obtained.

So that two things are evident. (*a*) Tubercle bacilli cannot be depended upon for early diagnosis; by the time they present themselves in the sputum a great deal of mischief has been done in the lung, and recovery is rendered prolonged and tedious. (*b*) Even in the later stages their presence cannot always be relied upon.

2. Medical opinion is not unanimous as to the value of tuberculin as a diagnostic agent. While Hammer, Bandelier and others maintain the great value of the tuberculin method, Bowditch found no reaction after an injection of ten milligrammes of

tuberculin, though tubercle bacilli were found a few days after; and Schule quotes several cases where bad symptoms appeared after the injection. My own experience has not been very satisfactory. I remember two cases where, after the injection, I had evidence of fresh congestive areas set up round the affected part, making the condition of the patients worse than before. So that, whatever may be the value of tuberculin in the diagnosis of bovine tuberculosis, one cannot speak with the same confidence with regard to human tuberculosis, because, I think, the cow is a natural beast, while man is becoming more and more unnatural, and living more and more in unnatural surroundings. And, believe me, that in that word "unnatural" lies the chief explanation of the futility of making experiments on the lower animals, and expecting the same result in human beings.

3. Much stress has been lately laid on the value of the radiograph as an aid to diagnosis of consumption. X-rays cannot be relied upon for very early diagnosis, as by the time the diaphragm becomes restricted and unilateral in its movement—the earliest sign of pulmonary tuberculosis the radiogram can detect—the patient has passed into the late periods of the consolidation stage. Long before this, physical signs would have made their appearance. Besides, we cannot in the present state of our knowledge of X-rays interpret with any certainty the meaning of the radiogram as indicating the commencing disease. At most X-rays can only serve as a valuable help to other clinical symptoms when they have established their presence.

My chief objection to these methods of diagnosis, excellent though they may be, is this: Why resort to these late and somewhat uncertain aids when we have in our ears a surer and readier means of finding out the early presence of the enemy. It is bad enough for the sake of civilisation that we should sacrifice our hair, our eyes, our teeth—even the nose is getting pinched and the lips are becoming smaller under the influence of civilisation; now we are asked to discard our ears, and give preference to laboratory evidence rather than to physical signs!

One of the most important lessons one learns from sanatorium experience is that the tubercle bacillus does not attack the patient

all at once, so that he becomes a consumptive in a few days or weeks ; but it is like a thief who walks up and down the street for days before he selects his house, and having selected his booty, he waits for a favourable opportunity to enter the house, and even after entering it he hides himself for some time, if the inmates are about, before he commences his nefarious work. So months and years may elapse between the first attentions the bacillus pays to the patient and his firm grip on him. So subtle is this enemy, so quietly, like a thief in the night, does he carry on his deadly work, that I have known patients who never suspected anything wrong with their lungs till they reached the last stage.

Pre-tuberculous stage.—The coming of the King Bacillus can be foretold by the advance guard, and the advance guard are the preliminary symptoms which the family physician has the advantage of watching, and which manifest themselves long before the lung is actually attacked. Some of the commonest of these symptoms are the following :—

(*a*) More or less deformity of the chest, perhaps only a slight curvature of the spine, brought on by rickets, &c. 20 to 30 per cent. of cases that come into my sanatorium present this symptom.

(*b*) Decayed and decaying teeth. More than 50 per cent. suffer from this trouble. I firmly believe that in very many cases carious teeth become the centre of infection, the infection being carried from thence into the apex of the lung through the tonsils.

(*c*) Enlarged glands of the neck and other parts of the body, 10 to 20 per cent. As mentioned before, enlarged tonsils form another very important mode of carrying infection.

(*d*) Pleurisy. 20 to 30 per cent. of patients give a history of pleurisy.

The relation between pleurisy and tuberculosis may be of two kinds :—

1. At this pre-tuberculous stage the patient may be attacked with simple pleurisy, which develops into tuberculosis in after years from the weakness it leaves behind in the lung ; or the pleurisy may be tubercular from the beginning, but lies latent,

waiting for a favourable opportunity in years to come to become active, and assume its real character.

2. The second kind of pleurisy attacks the patient between the second and third periods of the first stage, which we shall see presently. Of course, I do not include in these two the attacks of pleurisy that come and go during the course of the disease.

Consolidation stage.—After varying time of this pre-tuberculous or preliminary stage, we come to the classical first stage, which can be divided into three periods, first, second and third. Let us suppose that the enemy which has been lodging either in the decayed teeth or in the tonsils, or other enlarged glands, or in the pleura or some part of the lung, is ready to emerge from its fastnesses.

The first period corresponds to the time when the bacilli march onward to some definite field in the lung, and begin to pitch their tents or tubercles over the chosen camp.

The second period corresponds to the time when, still keeping to the same metaphor, the tents have been pitched, the discreet tubercles are formed, sentinels placed, and earthworks in the form of lymphoid and giant cells are erected in defence, within which the bacillus gets entrenched and hidden.

The third period corresponds to the time when man, the organism, alarmed at the presence of the enemy, sends large reinforcements or a blood supply to the part to surround the tubercles, bringing about an area of congestion. The inflammatory products form all round and between the tubercles, till the affected part becomes more or less, a mass of consolidation.

It may take months and even years before the third period is reached, and long or short intervals of quiescence may elapse between the periods.

What are the signs and symptoms to correspond with these periods ?

Physical signs and symptoms.—Taking the first period of the first stage, hæmoptysis, in some cases, betrays this period of infection. This early hæmoptysis, or more strictly speaking hyperæmia of the lung, is a good sign, for it shows that the organism has reacted very quickly, and at the very first approach

of the enemy it has begun to give battle, and sent an extra supply of blood to the affected part. The patient with early hæmoptysis often gets well, for the blood seems to set free phagocytes, which directly, or through their antitoxins, destroy the enemy, and many a patient has been saved by this timely help of nature. The hæmoptysis is generally small, and on examination you practically hear nothing. It is because the physician hears nothing that he is inclined to take no notice of the hemorrhage, or believe that it came from the throat or some other part of the body.

The physical signs of this period are generally negative. There is neither dulness nor crepitation, there is no cough or expectoration. There is, however, one sign which is invariably present, and to the practised ear pathognomonic, viz. the changes in the vesicular breathing Both the inspiratory and the expiratory note are altered, the inspiratory note being the earliest to alter. Instead of the respiration resembling the gentle sighing of the wind among the branches of the trees, the inspiration either becomes weak, or harsh, or rough, or wavy and interrupted, or cogwheel. After a little while the expiration is slightly prolonged. In every early case I examined these physical signs never failed me, so much so that I think one is perfectly justified in suspecting the disease if this altered inspiratory note is localised and persistent after two or three examinations.

A very important symptom of this period is the temperature, which goes up from a half to one degree. It goes up in the evening after exertion, and in women during pre-menstrual periods. In some cases the temperature may be lower immediately after exercise ; but to be of real diagnostic value the temperature must be taken at three different times : before the evening walk, immediately after, and a half to one hour after the walk ; and if there is a difference of a half to one degree in the temperature taken before and after the exercise, and this persists for a week, the suspicion of commencing disease becomes a certainty, especially if accompanied by the physical signs of the first period.

Besides these signs and symptoms, the patient is subject to a vague feeling of malaise. There is digestive disturbance, the

appetite is poor; he gets tired after exertion, and is nervous. In women there is languor and anæmia.

About this period there is another symptom which if present, becomes very significant, and considerably helps to clinch the diagnosis, viz. the frequency of the pulse, accompanied with or without palpitation. In these cases the patient seems highly nervous. It looks as if the commencing mischief in the lung has disturbed the nervous mechanism of the heart.

In the second period of the first stage the temperature shows a distinct rise in the evening and after exertion, the pulse is quicker, the patient's feeling of malaise becomes marked. The inspiration is harsh, and becomes cogwheel or interrupted. There is semi-dulness over the affected part, the vocal fremitus is slightly increased as compared with the unaffected side. The expiration is harsh and prolonged.

In the third period the physical signs are those of consolidation. The dulness is marked; there is impaired movement over the affected area, harsh or bronchial breathing; you hear a fine crepitation, or dry crackling, or a bright click at the end of inspiration. The expiration is prolonged and harsh. The temperature goes up in the evening. The pulse is quicker, the patient feels flushed and hot in the evening, and is easily fatigued.

Between the second and third periods an attack of pleurisy may betray the presence of the disease, with the usual symptoms of pleurisy. The evening rise from 99° to 100° persists from four to six weeks, thus revealing the tubercular nature of the disease.

Some cases do not advance further than this first stage. By this time the organism recovers sufficient strength to cut short any further encroachments of the enemy, or the patient's vague feeling of illness drives him to his family physician, who, perhaps without suspecting any commencing tubercular trouble, treats the dyspeptic and other symptoms, and recommends rest or change of air—all of which enable the organism to recuperate its flagging energies, so that it resists successfully, for the time at least, the invasion of the enemy. Thus many a case gets well at this early stage by the timely interference of nature alone, or with the help of the physician.

Even now the enemy may not be completely scotched. Perhaps he is only lying low, waiting for a more favourable opportunity to renew the attack. Thus the different periods of the first stage may drag on for months, or even years, the intervals of the invasion of the bacillus followed by successful attacks of the organism. But when it is finally overcome by the microbe enemy, the disease passes on to a later stage.

The second stage may likewise be divided into three periods. The first period corresponds to early softening. It is in the second period that the expectoration is well established, and sputum examination becomes possible, though we may be fortunate to get a little sputum in the first period; so that you can understand that by the time the patient has reached this period he has gone a long way down the hill, and though recovery is possible, it is brought about at a great sacrifice.

About the third period of the second stage there commence symptoms of mixed infection, with typical evening rise and subnormal morning temperature.

To recapitulate.—A weak vesicular breathing, or a harsh, cogwheel or interrupted inspiration, definite, localised and persistent, together with a slight evening rise, especially after exertion, marks the first period of commencing tuberculosis. In the second period these symptoms are accentuated, and besides the quickness of the pulse there is semi-dulness over the affected area, and prolonged expiration. The patient feels unwell, and is easily tired out. The semi-dulness deepens, till it becomes more or less absolute in the third period, when harsh breathing and impaired movement, with a bright click or dry crackling, is heard at the end of inspiration. The moist rales mean that the patient has passed on to the second or softening stage, when tubercle bacilli appear in the sputum.

The great importance of early diagnosis lies in the fact that in many cases it means early treatment and early recovery. Of course there are cases where, in spite of all our efforts, the patient grows steadily worse, and goes through the different periods and stages at lightning speed. It may be he has received an extra dose of infection, or the microbes have been of a virulent

type. Excepting these cases, my experience is that an early diagnosis means speedy recovery, and that the longer the diagnosis is put off the greater is the increase of the death rate.

The time will soon come when the medical profession will be so trained to detect the early signs of the commencing tuberculous mischief by physical signs only, that it will make use of the sanatorium, not so much for curing or arresting consumption, as for treating suspicious cases, and nipping the course of the disease in its early periods, and will thus prevent the terrible mortality this white plague causes at the present day.

CASE OF FILARIASIS WITH ABSCESS.[1]

BY

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THE patient, a man aged 30, came under observation on the day following his arrival in England from Duala, in German West Africa, after spending a term of six years in that country, during the latter three years of which period he had been subject to Calabar swellings. He had never contracted syphilis.

Onset.—He was in good health when he left Duala, on November 24th, 1906, but when two days out from Madeira, on December 13th, he was suddenly seized with a severe pain in the back, which he could not explain in any way. From this date onward the pain was incessant, until the patient arrived in Clifton, four days later.

5th day of illness.—When first seen he complained of pain in the back so acute that he resented the slightest movement. He lay perfectly still on his left side, his aspect was that of severe illness, with anæmia and furred tongue. The skin was universally

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pigmented and studded with small scars left by boils and craw-craw ulcers; the left arm presented one of these ulcers not yet healed. Examination of chest and abdomen revealed nothing abnormal, with the exception of impaired resonance and deficient breath sounds at the left base, with no adventitious sounds. Temperature, 98; pulse, 84; respiration, 20; urine, 1022, acid, no albumen or sugar. The back showed an almost imperceptible fulness over—and apparently of—the right erector spinæ at the level of the first lumbar spine. This swelling was tender, but neither hot, red, fluctuant, nor œdematous. Treatment: Aspirin, mesotan, hypodermic of morphia, and an aperient.

9th day.—General condition worse, malaise increasing, abdomen tense, occasional vomiting, inability to sleep; the swelling larger, measuring five by two inches, with also painful spasms of some fibres of external oblique to inner side of rt. ant. sup. spine of ilium. Temperature, 99; pulse, 90; respirations, 24; blood count—reds 4.5 millions, whites 8,000, hæmoglobin 75 per cent.; differential count—polymorphonuclears 66, lymphocytes 16, hyalines 8; *eosinophiles* 10 *per cent.*

13th day.—Condition more grave. Swelling of back six by three inches, with long axis parallel with spine. Marked dulness of left chest from base up to angle of scapula, with absence of inspiratory and very weak expiratory sounds. Apex beat displaced to ½-inch outside nipple line, in fifth space.

15th day.—Swelling measured nine by five inches; no redness or fluctuation. Examination of chest revealed friction sounds, chiefly expiratory, over liver in front and in axillary region, also in left axillary region over lower interspaces. Air entry at both bases very deficient. Apex beat 1½ inches outside nipple line. Temperature, 100; pulse, 84; respirations, 22; blood—whites 10,000, eosinophiles 18 per cent.

18th day.—Anæsthetic administered, and the swelling was incised. An exploring needle was inserted in several directions, and a portion of muscle removed and sectionised, but all with negative results.

27th day.—The peripheral blood was found to contain filaria, the average number in each drop examined being ten by day and

only three or four at night. The physical signs of the chest were so suggestive of an accumulation of fluid that an X-ray screen was used, but it failed to reveal any collection. During the past ten days Calabar swellings had appeared on the abdomen and left wrist, measuring about 1½ inches, and lasting for twenty-four or thirty-six hours in each case. Blood count showed: whites, 10,000; eosinophiles, 22 per cent.

40*th day*.—The general condition improved, and the swelling smaller—six by four inches.

61*st day*.—Swelling now measured only four by two inches, but during past three weeks there had been two acute exacerbations, with sudden increase in size of swelling and in severity of pain and general symptoms, lasting for six or seven days.

66*th day*.—Under an anæsthetic the tumour was incised, and an abscess was found situate in the deepest layer of muscles to the right of the spine. It tracked between the muscle fibres, and contained 3 oz. of thick, fusty-smelling pus. The cavity was lined with a thick layer of inspissated pus and lymph; this having been curetted away, the cavity was drained and the skin sutured. The contents of the abscess were carefully examined for the dead parent, Filaria Loa, but this, as might be expected from the character of the abscess contents, was not found.

77*th day*.—The operation wound had healed, and the patient was free from pain, feeling well, and the physical signs of the chest were normal, the apex beat being inside the nipple line and the air entry being good at both bases. The blood count now gave: reds, 4.500000; whites, 8,000; eosinophiles, 16 per cent. Filaria: by day eight in each drop; at night, *i.e.* from 10 p.m. till 8 a.m., none.

A few weeks later patient returned to Africa, and nine months later his left eye became "inflamed" for two days, during which time he twice saw a worm "under the skin of the eyeball."

Some points of interest in the case were the following:—

The physical signs.—The dulness of the left chest, with almost absent breath sounds and the displacement of the apex beat to 1½ inches outside the nipple line, seemed to be due, in a large measure, to the patient lying persistently on his left side day and

night. The friction sounds on the left side, which developed after two weeks' illness, suggest that the inflammatory process around the abscess spread through the diaphragm to the pleura.

The blood-count afforded the most obvious clue to the presence of some parasitic infection, inasmuch as the eosinophiles were always in great excess.

The identification of the Filaria was rendered difficult by their appearance in the peripheral blood at night as well as by day. In all other respects—in their shape, size and structure—they resembled the F. Loa; but that their periodicity should be upset by the habits of the patient was not in accordance with the recognised habits of this species of Filaria, and the possibility of a double infection with F. Loa and F. Bancrofti was considered. But the night blood never contained so large a number as the day blood, and as soon as the patient resumed his normal habits the night blood was quite free of Filaria, which pointed to the diagnosis of F. Loa being the correct one.

The abscess.—In many reported cases the parent worms have been recovered from abscesses, but as the mature parasite measures only 30 mm. by .3 mm., and as this abscess had existed for sixty-six days before it was evacuated, and its contents had undergone considerable inspissation, it would be improbable that the parasite, if dead, would not be disintegrated. The abscess contents possessed a peculiar fusty odour.

I am much indebted for valuable help given to me by Sir Patrick Manson, Mr. T. Carwardine, Dr. Charles, and Mr. James Taylor.

POSTSCRIPT, May 29th, 1908.—I have this day had an opportunity of seeing the patient, who has returned from Africa. His day blood contains numerous filariæ, 14 and 16 in each drop examined; whereas the blood at midnight shows no filariæ.—A. L. F.

LACHRYMAL OBSTRUCTION: ITS RESULTS, DANGERS AND TREATMENT.[1]

BY

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THE lachrymal apparatus consists essentially of the lachrymal gland which secretes the tears, and the canaliculi which collect them from the surface of the globe, and the lachrymal sac and duct which conduct them to the nasal cavity.

With the lachrymal gland we are not immediately concerned, and hence the considerations which follow will be confined to the lachrymal sac and nasal duct.

The canaliculi commence as two minute transversely oval apertures placed just behind the summit of the lachrymal papillæ, which are situated at the inner end of both upper and lower lid. These puncta open into the canaliculi, which are united with one another, internal to the caruncle, and open into the outer and fore part of the lachrymal sac. The canaliculi are lined by stratified epithelium on a basement layer, and have on their walls striped muscle fibres derived from the tensor tarsi muscle arranged spirally, but near the papilla circularly so as to form a sphincter; the lachrymal sac is situated in the lachrymal groove, and forms the expanded upper extremity of the lachrymal passage, measuring 12—15 mm. in length, 7 mm. antero-posteriorly, and 4 mm. transversely. It lies in a splitting of the periosteum, which divides along the crest of the lachrymal bone. The posterior layer covers the floor of the lachrymal groove, and the anterior becomes the internal palpebral ligament.

The upper blunt and blind end of the sac rises about 2 mm.

[1] Read at the meeting of the Bristol Medico-Chirurgical Society, March 11th, 1908.

above the upper edge of the internal palpebral ligament; externally it receives the canaliculi guarded by the valve of Rosenmuller, and below it opens into the nasal duct, its down ward continuation. Over it lie the palpebral ligament and a part of the orbicularis muscle.

Where the sac narrows to become the nasal duct there is an annular fold based upon a thickened ring of periosteum ; this fold is the valve of Krause. The sac is lined with ciliated epithelium and mucous secreting cells ; the submucosa is loosely tied down to the periosteum, and is surrounded by a cavernous system of veins continuous with the vessels of the inferior nasal meatus.

The nasal duct is about 18 mm. in length and 3—4 mm. in diameter. It lies in a groove in the superior maxilla, and running downwards and backwards opens into the inferior meatus of the nose at the junction of the anterior with its posterior three-fourths, about 30 mm. behind the posterior margin of the nostril. Its lower extremity is guarded by the valve of Hasner.

The mucous membrane of the sac and duct forms one continuous whole, and there is, therefore, no dividing line between these two structures. The main distinction is the fact that the sac is surrounded on one side only by bone, and hence can enlarge in other directions, whereas the duct is entirely surrounded by a bony casing. Hence, if the lachrymal channels be distended with fluid, the only place where this can show itself externally is by a visible enlargement of the sac just below the internal palpebral ligament.

The nasal duct is the place where strictures occur, which never occur in the sac, and only occasionally in the canaliculi.

The lachrymal secretion is a clear alkaline fluid containing about 1 per cent. of solids, chiefly sodium chloride. Normally, the amount of tears secreted is not more than is lost from the surface of the globe by evaporation, only a minute quantity escaping into the lachrymal passages. When excessive, as by the irritation of a foreign body, the surplus passes into the nose, and becomes apparent by the constant sniffing and blowing of the nose.

The eye is not entirely dependent upon the lachrymal gland

for its moisture ; a certain amount is derived from the secretion of the conjunctiva and the several accessory glands present, so that even when the lachrymal gland is removed or degenerates the eye does not become dry.

In the conduction of the tears the features to be considered are the series of events that occur with each act of winking, and the inherent elasticity of the lachrymal sac.

With each act of winking the lid margins come into contact in a continuous wave commencing from their outer part, that is, the outer part of the lids meet first, and this meeting travels from without to the inner parts of the lids. The palpebral fissure also moves bodily inwards. Thus any superfluous tears are swept towards the triangular area situated over the caruncle. That the proper closure of the lids is essential is shown by the epiphora, which is such a constant feature in paralysis of the facial nerve.

With each contraction of the orbicularis muscle tension of the internal palpebral ligament is produced, and also a contraction of Horner's muscle, which lies behind the lachrymal sac. This causes the anterior and posterior walls of the sac to be separated, and thus expands its cavity. Again, the puncta are drawn into closer contact with the globe, and no doubt capillarity comes into play ; in this way tears are sucked into the lachrymal sac. The return of tears is prevented by the circular and spiral musculature of the canaliculi and the imperfect valvular apparatus of the mucous membrane of the nasal duct.

When the lids are opened again the walls of the sac come together, and thus by elastic recoil, assisted by the action of gravity on the tears, force the fluid down the lachrymal duct. This conclusion is supported by the fact that in dilatation of the sac, and its subsequent atony from distension, the sac is not emptied even when the nasal duct is patent.

Again, since lachrymal secretion finds its way into the lachrymal sac when the nasal duct is occluded, the hypothesis that descent of tears is due to the suction caused by the act of inspiration cannot be accepted.

Obstruction to the nasal duct—which forms the starting-point

of all the troubles met with in considering the lachrymal passages —is often secondary to affections of the nasal cavity.

They are :—

(1) Inflammation of the mucous membrane of the nose. If swelling of the nasal mucous membrane exists, it is easy for the opening of the nasal duct into the inferior meatus to be occluded, or for the swelling to extend far up the nasal duct, and such a condition would follow an ordinary cold in the head. It may also occur in chronic inflammatory diseases of the nose, such as chronic rhinitis, but in such a condition as ozæna the duct is occluded by cicatricial contraction.

(2) Ulceration of the nose due to tuberculosis and syphilis.

One of the commonest causes of nasal obstruction is congenital syphilis, when this disease attacks the nose; and besides the ulceration of the mucous membrane, it is usual to meet with caries of the bones encasing the lachrymal sac and duct.

(3) Tumours of the nose, the commonest being polypi. The simplest form of lachrymal obstruction is the obliteration of the nasal duct due to swelling of the mucous membrane, and the surrounding plexus of veins, due to the extension of a similar condition from the nose. Here there is no organic stricture, and as the coryza subsides so does the lachrymal obstruction disappear. However, when chronic the condition becomes a great annoyance, owing to the epiphora and the frequency with which the patient has to dry his eye. This is the simplest condition for which patients usually seek treatment.

The next step is that of chronic dacryocystitis, or lachrymal mucocele. The patient complains of epiphora; we find a soft swelling just below the internal tarsal ligament, due to over-filling of the lachrymal sac, and upon pressure the contents are evacuated through the puncta into the conjunctival sac. This consists either of a puriform fluid, or in cases of very long standing clear mucus. The contents may in some cases be evacuated into the nose, but this is exceptional.

Associated with this condition, it is usual to find a stricture of the nasal duct. This occurs most commonly at the place where the lachrymal sac joins the nasal duct, where, as was

previously stated, the wall of the duct is constricted by a ridge of the surrounding periosteum. As a result of this stricture, the secretions of the conjunctiva are retained in the sac, and the lachrymal sac becomes gradually filled, and here the contents remain stagnant and undergo decomposition. The conjunctival sac swarms with microbes, and these are swept into the lachrymal sac, and here flourish on the dead material present. The lining membrane of the sac becomes irritated and inflamed, its mucous secretion is greatly increased—as is seen in chronic conjunctivitis—and the sac wall ultimately exudes a purulent secretion much resembling pure pus.

The tumour of the distended sac may grow to quite large dimensions, and one as large as a Barcelona nut is not very uncommon.

The course of the condition is always extremely chronic, and in the majority of cases incurable. If left to itself, the sac may undergo atrophy, and thus a cure be effected.

Lachrymal mucocele is sometimes seen in babies, and this is due to the blocking of the lower end of the nasal duct by epithelial debris, or incomplete canalisation of the rod of cells from which the nasal duct is developed.

Acute Dacryocystitis, Lachrymal Abscess.—It is but a small step from the condition of mucocele to the next seen in acute dacryocystitis. If some of the contents of the sac escape into the surrounding tissues, either through some ulceration of the mucous membrane or an abrasion caused by probing, a cellulitis of the surrounding tissues follows, and the patient will present himself with great swelling of the lids and face, and even chemosis of the conjunctiva ; fluctuation will be obtained later over the area of the sac, and if left to itself the abscess will burst just below the internal tarsal ligament. As the result a sinus is formed, connecting the interior of the sac with the skin of the face, and the secretions will escape by this path. If the sinus close, a recurrence of the inflammation follows, and a succession of lachrymal abscesses.

The Dangers of Lachrymal Obstruction.—It may appear that apart from the annoyance caused by the epiphora, the disease

may be considered quite a trifling one, but this is far from the truth, and, especially in hospital practice, we are constantly seeing eyes hopelessly damaged as a result.

One of the most serious of all diseases of the eye is serpiginous ulcer, or hypopyon keratitis, due to an invasion of the cornea by the pneumococcus. The sequence of events is this :—

The patient has lachrymal obstruction, and the resulting mucocele is constantly discharging its contents into the conjunctival sac. As previously stated, this discharge is full of organisms, including the pneumococcus ; some slight injury to the cornea occurs, an abrasion may be due to a touch or the presence of a foreign body, and the wound becomes infected. If this occurs, the best that can be hoped for is a corneal scar, which more or less seriously reduces vision.

A common result is perforation of the cornea by ulceration, and a dense leucoma with inclusion of the iris, causing the eye to become for all practical purposes blind, and unless judiciously treated excision will be required for the pain produced by a secondary glaucoma. The other alternative is panophthalmitis, and even sympathetic ophthalmia is not unknown.

It is, therefore, the invariable practice to examine for the presence of a mucocele in any patient with corneal ulceration, since it is obviously of no avail to treat an ulcer in the presence of a focus of certain reinfection. Again, the lachrymal sac must always be examined in any patient who requires operation, be it for squint or any intra-ocular operation, such as extraction of cataract or glaucoma iridectomy. To undertake an operation in the presence of a mucocele is to court disaster.

The diagnosis of lachrymal mucocele is easy when the sac is full of pus which can be easily and visually expressed, but when any doubt exists two methods are available.

If a drop of fluorescin be dropped into the conjunctival sac, and the patient be directed to open and close his eye several times ; the presence of fluorescin on his handkerchief when he blows his nose will be proof of the patency of the nasal duct. It does not necessarily follow that the failure of this test proves the patient to have lachrymal obstruction.

The other method is, after dilating the lower canaliculus, to inject some fluid into the sac by means of a special syringe. If this be done with the patient's head bent forward, the fluid will escape through his nose if the duct be patent ; if the head be bent backwards, ask the patient if he feels any fluid trickling down the back of his throat. This is often apparent by the swallowing movements made.

The Treatment of Lachrymal Obstruction.—In the treatment of lachrymal obstruction it will be necessary to consider the various stages through which the condition passes, and in what stage the patient presents himself for treatment.

There is a condition causing epiphora, and although not due to blocking of the nasal duct, yet is functionally comparable ; it is want of proper approximation of the lower punctum to the globe. It is a common practice in such a condition to slit the lower canaliculus, and if it be deemed insufficient, to remove part of its posterior wall with scissors ; this may remove the epiphora, but a better method is to bring the punctum back to its original position, and avoid unnecessary mutilation. If the point of the galvano-cautery be applied about 3 mm. behind and below the punctum, and the lid seared fairly deeply, the resulting cicatricial contraction will draw the punctum back into its place. It is quite a painless operation under cocaine, and may easily be repeated.

In cases of true obstruction, any abnormal nasal condition should receive treatment, and this is a point likely to be overlooked.

In those cases in which the obstruction is due to swelling of the mucous membrane, and in a chronic condition, the sac should be syringed daily with boracic acid lotion, followed by 15 per cent. protargol or sulphate of zinc lotion, and after a few moments again washed out. These cases improve greatly, and may be cured by this simple method. If, however, no improvement follow after, at the most, six weeks, the condition is probably one of organic stricture of the duct.

So far only cases of simple obstruction without mucocele have been considered. If in a patient with or without mucocele

a course of syringing as above described produces no marked improvement in six weeks—and it is a treatment patients may be quite easily taught to carry out for themselves—the lachrymal sac should be excised.

In babies with mucocele a mode of treatment based on the physiological action of the various factors that empty the sac is most successful. The child is placed on its back, and a pool of boracic lotion is allowed to rest over the inner canthus ; alternately the outer canthus is pulled upon and the lachrymal sac compressed, thus exaggerating the normal conditions seen when the eye is opened and closed voluntarily. The sac should not be syringed, since even with the greatest care extravasation of fluid frequently results, and even facial cellulitis. This should be repeated three or four times daily, and can easily be performed by the mother or nurse.

In acute dacryocystitis the abscess should be incised, and when all inflammatory signs have disappeared the sac should be excised.

It will be noticed that no mention whatever has been made of the usual treatment of lachrymal obstruction by the use of probes, the insertion of solid or hollow styles, and the rest. The objections to this method are many, and some may be mentioned here :— (1) Before the uses of probes the lower canaliculus has to be slit ; (2) in cases of obstruction due to congestion of the mucous membrane the practice is not only unnecessary but also unsurgical ; (3) it is extremely painful, and the chances of damage to the mucous membrane are considerable, especially in cases due to congestion, when the obstruction may be aggravated ; (4) it is uncertain, and in cases in which the treatment has been carried out for months, or even years, a failure is the frequent result ; (5) in cases in which a stricture exists, the passage of probes must injure the mucous membrane, and the stricture may be made worse ; (6) the common seat for stricture is completely surrounded by bone, so that a probe cannot stretch it to anything approaching the extent required to overcome the resilience of the fibrous tissue causing the obstruction, and if a probe which would appear sufficiently large to thoroughly dilate the stricture be used,

the only result is to crush the walls of the nasal duct between the bone and the probe; (7) the results of excision of the lachrymal sac are so satisfactory, and the operation so comparatively easy, that the certainty of cure is not to be compared with the great uncertainty of probing.

There is one condition in which it may be allowable to pass a probe, and that but once. In cases of mucocele in quite small children which resist prolonged treatment on the plan above described, the passage of a small probe under chloroform without previously slitting the canaliculus is often followed by a complete cure.

The operation for excision of the lachrymal sac is performed as follows:—

The internal palpebral ligament is put on the stretch, and made prominent by drawing on the external canthus. An incision about 2 cm. in length is then made, commencing just above the centre of the ligament, about 5 mm. from the inner commissure of the lids, and continued downwards and then a little outwards, following the margin of the orbit. Care should be taken not to cut too far inwards, since injury to the angular vein causes troublesome hemorrhage, and obscures the field of operation. The incision should be planned so as to completely divide the internal palpebral ligament and lay bare the sac wall at once, or even open it, and then the wound is made to gape with an automatic retractor. The sac is then grasped in a stout pair of fixation forceps, and the rest of the operation performed with a blunt dissector. The outer wall is first freed, then the fundus, then the inner wall: the duct should be freed as low down as possible, and either twisted off or divided with a stout sharp pair of scissors. It is then an advantage to scrape the lower part of the nasal duct with a small sharp spoon, although this is not always necessary. Two skin sutures of silkworm gut are then inserted, and a small pressure pad applied. The accompanying oozing of blood is trifling, and the field can be kept dry by a good assistant using dry pledgets of wool, and occasionally temporarily plugging the wound for a few moments with wool soaked in a solution of adrenalin.

The wound heals by first intention, and dressings may be abandoned in about four days.

The succsss of the operation depends upon the complete removal of the sac, and the place where failure may occur is in dealing with the fundus. If, however, the internal palpebral ligament be divided, there should be no difficulty, and before closing the wound it should be rendered anæmic with adrenalin, and well inspected to make sure the sac has been completely removed.

It might be thought that after removal of the lachrymal sac the epiphora would be worse, or at least as bad, as before. Experience shows that patients are grateful for the relief and comfort given them, and that the epiphora disappears and only makes itself apparent in a very sharp wind or in sudden changes of temperature, as when leaving a warm room and going into the night air. The explanation seems to be this. The secretion of the mucocele is a constant source of irritation to the conjunctiva, and in every case a certain amount of conjunctivitis is present, and when the source of irritation is removed, not only does the hypersecretion of tears disappear, but the lachrymal gland seems to accommodate itself to its new conditions.

The scar of the operation falls into the natural folds of the face, and becomes almost invisible, so that in many cases it can only be discovered after a careful inspection.

Progress of the Medical Sciences.

MEDICINE.

Carbon Monoxide Poisoning.—It has been evident for some time past that the importance of this substance as a lethal agent is increasing, and that the variety and complexity of the symptoms have been underrated. It is now produced in gigantic quantities in various processes, for not only is it a common cause of death in colliery explosions and from accidents at blast furnaces, but the recent introduction of electric furnaces, water gas, nickel carbonyl, and other factories has brought it everywhere among us. In the works of one company only, who get power from the

Niagara Falls, sixteen tons daily are evolved. In France the charcoal stove has long been a favourite method of suicide, but in England, and still more in America, the use of carburetted water gas as a means of enriching coal gas at a cheap rate has led to an immense increase of fatalities which are frequently unintentional. Nearly 15 per cent. of all the English gas works, private and municipal, together supply their gas mixed with this water gas in quantities varying from 3 to 60 per cent. in the different companies, and the total output exceeds 18,000,000 cubic feet. Now the danger of this is shown by the experience of America. In eighty-eight cities, the total population of which was equal to that of London, the deaths from pure coal gas only numbered three, but in Boston, Brooklyn, Chicago and San Francisco, where the proportion of water gas was very high, the deaths amounted to 935 in a smaller population. The gas quickly loses its odour, and easily passes through the subsoil or brick walls, so that the gas from a broken main may cause poisonous results in a house adjoining. In one instance the illness produced was thought to be typhoid (Pettenkofer), and the nurse and another patient were believed to have been infected by the first case. In fact, many instances of "sewer gas" and "blood poisoning" are probably due in reality to carbon monoxide, which has gained entrance through a defective pipe. Even pure coal gas contains a proportion of some 6 to 9 per cent., but water gas has often 50 per cent. The symptoms of poisoning come on insidiously, even in severe cases. There may be at first slight dyspnœa and palpitation, loss of perception of time, and of the power of recognising friends before the patient realises that anything is amiss. He may be excited, or simply drowsy, and then unconscious. Death may follow suddenly after muscular exertions in attempts to escape. The effects depend much on the amount of oxygen present. If this is low, carbonic oxide may cause death in a few seconds with convulsions, whereas in an atmosphere of oxygen Haldane and Mosso have shown that enormous amounts are tolerated, because the red cells are then less important, and much oxygen may be conveyed by the plasma.

A theoretical discussion has arisen as to whether CO has a directly poisonous action on the tissues, or merely shuts off all oxygen from them. The peculiarly stable compound it forms with hæmoglobin is well known, and the changes in the nervous system are numerous and important. Hence, besides immediate symptoms we see sometimes in those who recover mental and nerve affections lasting for weeks or years. Mott[1] has found most extensive cerebral hemorrhages and softenings, and fatty degeneration of other organs. Edsall and others describe corresponding symptoms—hemiplegia, dementia, hallucinations, altered reflexes, peripheral neuritis, and sudden heart failure. Permanent effects

[1] *Arch. Neurol.*, 1907, iii. 246.

may not be preceded by acute poisoning, as in a case described by Lewin.[1] Here a woman exposed to water gas suffered merely from vomiting and headache without any physical signs of illness, but remained mentally affected for many months. Scott[2] reported other instances where mania, melancholia and dementia followed acute poisoning. Gilman Thompson,[3] in a study of ninety cases, remarks on the general presence of pyrexia, preceded or followed by subnormal temperature, and of leucocytosis, which in fatal cases may reach 50,000. Coma may last for days, even in hopeful cases; albuminuria, or glycosuria, and pneumonia are not infrequent.

Glaister[4] discusses the results of chronic poisoning, where, for instance, persons have worked under burners consuming much carburetted water gas, and thinks that to this is due the anæmia, anorexia, loss of nutrition, and mental apathy which so many of these operatives suffer from. He argues that where mixed or impure gas is supplied, an inspection of all pipes and fittings should be enforced. More injury to health is done, he thinks, from impure coal gas than from sewer gas. The question, though by no means settled, is important. If the benefits of fresh air are great, what are the active elements of impure air? Are its effects chiefly due to carbon monoxide? Louis Parkes[5] points out that carbonic acid has of itself little importance. Nature never allows us to take a breath free from it, and the high percentage in the pulmonary alveoli is always kept constant. The diminution of oxygen in crowded rooms never reaches that found in healthy places at high altitudes. No volatile organic poison has been discovered in expired air, and apart from the germs of phthisis and a few other diseases, no pathogenic organisms have been found. We have, therefore, either to invoke some unknown constituent, or to fall back on carbon monoxide. It is clear that in severe cases of poisoning by the latter, the lesions in the vascular and nervous systems are most extensive and lasting. Are the effects of small repeated doses a common cause of ill-health, though no pathological changes can be found?

* * * * *

Calmette's ophthalmic reaction for the diagnosis of tuberculosis is of importance in various ways. In the first place, it may prove to be a great assistance in the early discovery of disease while easily curable, in which case its value will be incalculable. Again, just as with the Widal reaction, the pathological process may throw light on the physiology of immunity, and, finally, there are already indications that similar reactions will facilitate the diagnosis of other diseases. Thus Chantemesse has obtained a

[1] *Berl. klin. Wchnschr.*, 1907, xliv. 1367.
[2] *Lancet*, 1896, i. 217.
[3] *Med. Rec.*, July, Sept., 1905 (?).
[4] *Lancet*, 1906, ii. 1578.
[5] *Practitioner*, 1904, lxxiii. 550.

specific reaction in the eyes of typhoid patients by instillation of a typhoid antitoxin.

Widespread controversy has arisen as to the value and dangers of the test, but it has already been extensively used. Calmette, in January last, could point to 10,000 cases where it had been employed, and a steady flow of reports still continues. The idea was developed from some investigations of von Pirquet upon small-pox.[1] He noticed that the size of the papules produced by inoculating calf lymph varied with the concentration of the lymph used, and it occurred to him that similar results ought to follow the inoculation of the virus of other disease in susceptible people. He found that 25 per cent. of tuberculin did actually produce a similar papule, but only in tuberculous persons. It next appeared that the reaction was sufficiently regular to serve as a means of distinguishing tuberculous children, though with adults it was uncertain from the frequency of healed tuberculosis. From the results of one hundred *post-mortems* on children, he was able to assert that a positive result is certain proof of the existence of the disease, and a negative one strong evidence of its absence.

Calmette[2] then devised his plan of dropping into the conjunctival sac a one per cent. suspension in distilled water of tuberculin which had been precipitated by alcohol. He found that in tuberculous patients some redness and swelling resulted in a few hours, with the formation of a fibrinous exudate. Usually the symptoms, and any discomfort felt, passed away in two or three days. On the other hand, in really healthy persons a reaction was distinctly rare.

Further use has shown several possible sources of error. Thus Smithies and Walker[3] point out that if the solution is not fresh, or is not homogeneous throughout, a patient may not get an effective dose. Failure may occur if it runs out or is wiped out of the eye, as may happen with a crying child. Again, the instillation should be done in the morning, to allow of the eye being watched during the rest of the day, or the reaction may be over before we see it.

In very cachectic patients, or those actually dying of phthisis, a reaction is rare, and, on the other hand, in some cases of syphilis or actinomycosis reactions may occur, just as tuberculin injections will at times react in the same class of patients. Other observers claim that reactions may be met with in typhoid, but this has been denied. Again, there is reason to suspect that when a markedly negative phase is present in phthisis, the reaction may be doubtful or delayed, though a definite result will follow if the test be repeated later on.

When these sources of error are avoided, have we a test which can be relied on? The general opinion so far seems to be that it

[1] *Proc. Roy. Soc. Med.*, Path. Sect., 1907–08, i. 74.

[2] *Presse méd.*, June 17th, 1907. [3] *J. Am. M. Ass.*, 1908, l. 259.

is fairly accurate. The difficulty of verifying the results is indeed very great. For tuberculosis varies enormously. There may be a slight and quickly cured local lesion, or a widespread and fatal affection. Before a doubtful case which has been tested dies, a slight lesion may have entirely healed, or a new infection may have taken place. It is probable that a really cured case of phthisis does not give a reaction, although the marks left by the disease may be evident *post-mortem*. Thus at the Mount Vernon Hospital numbers of negative results were found in convalescents, though every one of the active cases with bacilli was positive.

On examining the statistics, it is lamentable to find that hundreds, and perhaps thousands, of cases are useless for comparison, because no common form of classification has been adopted. The same difficulty vitiated many of the early sanatorium statistics. Some writers use various strengths of tuberculin in succession, as Eisen did, without mentioning which was successful. Many do not distinguish between known and doubtful cases of tuberculosis which were tested. The confusion in even the best papers is inconceivable, and most writers are more interested in mentioning special cases than in giving the comparative results.

It has been claimed that in proved tuberculosis a positive reaction occurs in about 95 per cent. of the cases, and upon taking a large number of recent reports, which were more or less uniform in method, and after eliminating the doubtful reactions and separating where possible the doubtful from the proved tubercular cases, this claim was substantiated. Thus for 1,072 cases given by English, French and American writers, there were[1] :—

(A)	Definitely tuberculous	472 = 455	positive, or 96 per cent.
(B)	Doubtfully tuberculous	124 = 78	positive, or 63 per cent.
(C)	Non-tuberculous	476 = 15	positive, or 3.3 per cent.

Though it is impossible to be sure of the accuracy of the previous diagnosis in every case, these results are sufficiently striking.

After all, the great question is, What is the value of the test in the borderland cases of tuberculosis? Is it one which will enable us to decide definitely when all the other means of diagnosis fail, and to recognise the earliest cases of disease? The really important point is its accuracy in the mildest forms of infection. We do get some slight evidence on this subject. Paul Eisen[2] obtained his highest percentage of reactions in the very earliest cases of phthisis (Turban's Stage I.). The previous diagnosis, in default of physical signs, was here confirmed by tuberculin

[1] Smithies and Walker, *loc. cit.*; Webster and Kilpatrick, *Brit. M. J.*, 1907, ii. 1644; Austin and Gruiibaum, *Proc. Roy. Soc. Med.*, Path. Sect., 1907–08, i. 74; Maclennan, *Brit. M. J.*, 1907, ii. 1642; Letulle, *Presse méd.*, July 3rd, 1907; Meille, *Brit. M. J.*, 1908, i. epit. p. 5; Stephens, *ibid*, 1908, i. 742.

[2] *Beitr. z. Klin. d. Tuberk.*, 1907, Hft. 4.

injections, and the positive results were 78 per cent., as against 70 in Stage II., and 50 in Stage III. It is clear that the most urgent need is for an accurate register of very early cases and their results, with subsequent tests by other methods, if the delicacy of the reaction in these liminal instances is to be relied upon. Dr. Edgeworth has recommended that the opsonic index of doubtful cases which give a positive reaction should be taken on several occasions afterwards. Great variations in the opsonic index will fully confirm the tuberculous nature of the disease. Where an instillation into the eye is objectionable, H. de C. Woodcock suggests an alternative. He produces on the chest two small blisters. To one of them, on the second day, he applies Koch's new tuberculin (T.R.), allows it to dry, and then covers both with sterilised lint. The next day the one so treated is red with a surrounding halo if tuberculosis is present.

G. PARKER.

SURGERY.

Brain Surgery.—During the last few years advance has been made in greater accuracy of diagnosis, larger number of cases operated on, and higher percentage of successes.

The introduction of large osteoplastic flaps, and systematic operations for relief of symptoms without removal of the disease, are the two chief innovations.

Injuries.—Trauma at birth, giving rise to asphyxia; a bulging fontanelle without pulsation, convulsions and hemiplegia, and other signs of compression, with usually a rise of temperature, have had bone turned down and extravasated blood let out, with a large percentage of successful results.[1]

Fractured base.—Cushing[2] relates two cases with compression symptoms, in which, a few days after the injury, clots were let out and a drain put in with recovery. During the last year he had performed this operation almost invariably after fracture of the base, because nearly all the symptoms are due to intra-cranial pressure. It gives the surgeon a definite way of attacking what had been before considered pretty hopeless cases. Most neurologists believed that this operation, in these cases, is most apt to do away with the distressing features of post-traumatic neuroses.

Dennis[3] points out that as the brain is incompressible and the cranium inexpansile, hemorrhage, or other foreign body, must find room at the expense of the blood and lymphatics. He therefore advises operation always for pressure with coma, and for pressure without coma if the symptoms are progressive.

He relates a case of a child which fell from the third floor to the pavement, and had coma and hemiplegia from a depression of the skull in the motor area, and was relieved of both conditions

immediately by manipulation, raising the bone. The writer saw two cases of this sort in children of two years or under at the Bristol Royal Infirmary, where pond depressions, larger than a teaspoon, were elevated by him in a similar way, just as one can raise the dent out of a felt hat, the bone springing to its level again with a slight noise.

Intermittent headache, paralysis, and even mania after an injury, is suggestive of arachnoid hemorrhage, and is curable by operation. Lumbar puncture will tell the nature of the fluid in intradural or arachnoid space, but not differentiate them; it is of great use, occasionally, in the diagnosis of hemorrhage in fractured base.[1] In extradural hemorrhage the fluid, of course, will be clear.

Traumatic encephalocele, according to Ballance, demands that the bone be cut away till the tumour pulsates freely, after which, if all goes well, it returns gradually to the cranial cavity.

Meningocele and Encephalocele.—Operation is contra-indicated when the soft parts are deficient as well as the bone, as in a toad monster, to take an extreme case: also when in the occipital region there is, in addition, deficiency in the upper spinal region; and thirdly, when there is as well hydrocephalus.

In other cases the only treatment is with the knife; if there be brain also in the tumour it is no matter, it should be clamped and turned in or tied off. A stop-gap of some foreign body may have to be used to supply the want of bone.[3]

Hydrocephalus.—In spite of numerous procedures, there is nothing reliable at present in the way of treatment.[3]

Meningitis is beginning to come a little more within the reach of surgery.

Traumatic.—Pus between the dura and bone, from scalp wounds, is much rarer than it used to be when Pott first described his puffy swelling: "It is very important to trephine early in these cases, should any symptoms arise in the second week."[4] The dura is very resistant, and extra-dural abscess, from this or other causes, may be present weeks without giving rise to meningitis.[1]

From bone or sinus infection.—The treatment in ear cases is well recognised. Frontal and ethmoidal suppuration should be treated in the same way that temporal is, by complete ablation.[1] If meningeal symptoms continue after a mastoid operation, the dura should be opened.

Hinsberg refers to several cases of apparently hopeless *suppurative meningitis* cured by drainage in the posterior fossa on both sides.[1]

Tubercular Meningitis.—Ballance[1] says: "Until more complete operations have been performed in early stages of tuberculous meningitis (*i.e.* draining the arachnoid space and sylvian lakes on both sides), we cannot say whether the disease

is likely to be modified in the same favourable manner by operation as tuberculous peritonitis."

Abscess.—These have been reported occasionally as cured without operation; if so, they were probably tubercular.

Ballance lays stress on following an abscess by its track, whether traumatic or due to bone disease. If they can be opened through their stalk, it prevents closing of the sinus, and also hernia, besides lessening the chance of infecting the adjacent meninges.[6] To explore for an abscess, he advocates a long, sharp-pointed, narrow knife, as much better than trocar, grooved needle, etc.

Tumour.—Whether a tumour should be partially removed when total ablation is impossible, on the assumption that they grow more slowly after such treatment, is a subject of argument. Ballance says yes, Spiller[7] no. About tumours there is one opinion in which all writers seem to be in accord, that is that where a tumour cannot be removed—either on account of its size, or more often because the localising symptoms are absent or inefficient—then a palliative procedure should be done. This will relieve headache, vertigo, nausea, vomiting, and, most important of all, optic neuritis. This latter is really a congestion, not an inflammation; if relief of tension comes soon enough, it will clear up almost at once, and so save the patient from going blind.

Compression of the brain, therefore, may be operated on in two kinds of cases. Just as a band divided in acute intestinal obstruction gives relief, so will trephining in acute compression from a ruptured meningeal artery; and as colotomy relieves chronic obstruction, so decompression will do the same for the brain.

The best spot to choose for relief of tension depends on whether an attempt is to be made at the same time to remove the cause.[8] If the situation is unknown, then a region well covered by muscle, such as the temporal or occipital, is chosen, because after an area of bone has been removed the muscle will control the size of the curative hernia, and avoid fungation ending in meningitis. Some remove portions of dura mater. Frazier[7] is strongly opposed to this, and quotes many cases to show that it is unnecessary.

As a practical precaution,[9] lumbar puncture, to diminish tension, should be done before opening the dura in any compression case, as it facilitates exploration, and saves the brain from damage by bulging during the operation.

Technique.—There remains only to be said a few words on this subject. Many cases are best operated on in two stages; it lessens the shock, and the absence of meningeal bleeding is a great assistance at the second operation. Cushing[10] has also discovered that a tumour may be removed with almost no pain

without anæsthesia, which may prove a method of great value in the future.

Bergmann[11] sums up the methods of opening the skull. He advocates, as most do now, the osteoplastic flap, made either by Wagner's plan, chiselling through the bone; or Doyen, with his burrs and saws; or perhaps, best of all, Obalinski's, with Gigli's saw and trephine holes. Sudek's trephine drill is another good, rapid method.

When bone has had to be taken away, and it is advisable, if possible, to close the gap again, the best method seems to be that of Müller and König, who elevate a living flap of bone—the outer table only—and slide it across with a periosteal hinge to cover the space.

The greatest advance of all is in the size of the flaps, often several square inches in area, which is useful to the surgeon for many reasons, not the least being that accurate topography is now almost unnecessary.

E. H. E. STACK.

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5 Bergmann, "System of Practical Surgery," i. 170 *et seq.*
6 Ballance, Op. cit., p. 141 *et seq.*
7 Spiller and Frazier, *Univ. Penna. M. Bull.*, 1906-7, xix. 146.
8 Cushing, *Surg., Gynce. and Obst.*, 1905, i. 297.
9 Ballance, Op. cit., p. 199.
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DERMATOLOGY.

The study of **tuberculosis of the skin** has attracted so much attention of recent years, particularly since Finsen's therapeutic researches, that a complete review of the present state of our knowledge of the subject is very apposite. An excellent summary has been made by Alexander, of Berlin, which helps materially to a proper appreciation of the vastly increased importance now allotted to tuberculosis as a factor in skin diseases.

In **diagnosis** he draws attention to the value of tuberculin injections, which have been so profitably employed by Neisser, Jadassohn and others to demonstrate the tuberculous nature of various dermatoses. The method is of course familiar, consisting in the subcutaneous injection of a small quantity of Koch's "alt-tuberculin" into a suitable spot (dose, $\frac{1}{2}$–1–5–10 milligrammes), when the appearance of a local reaction and a rise of temperature is found to result in tuberculous subjects. This reaction to tuberculin has been found to be most constant in

lupus vulgaris, but it is only a little less certain in many other forms of tuberculosis cutis, except in the verrucous variety (verruca necrogenica), when for some reason, possibly the presence of so much fibrous tissue, the reaction is often absent.

More important, however, than the fact that occasionally there is a negative result in a tuberculous case, is the knowledge that no other cutaneous affection, especially tertiary syphilis, which presents in practice the greatest difficulties as regards differential diagnosis, will react to tuberculin.[1]

The only possible exception is tubercular leprosy, which gives an apparently similar reaction, but the temperature as a rule rises later or repeatedly, whilst the accompanying reaction shows characteristic variations.

A *general* as well as *local* reaction may be relied upon with almost absolute certainty for lupus, and in most instances a well-marked *local* reaction alone may be regarded as equally dependable. On the other hand, the *general* reaction without the *local* does not answer the question as to the skin condition, for there may be some other tuberculous focus in the body causing the temperature to rise with the injection. The absence of the *general* reaction may be interpreted as a probability of the non-tuberculous nature of the dermatosis, but Jadassohn has pointed out that this is not conclusive, for possibly very small cutaneous foci will not suffice to disturb the temperature.

Alexander insists on the necessity for exact technique in making the injection. The solution must be fresh. A series of injections must be made starting with $\frac{1}{2}$ mg.; if no reaction follows, a second injection of 1 mg. is given after two days' interval, and so on if necessary to 5 mg., and finally to 10 mg. This "progressive" dosage must be strictly adhered to if the results are to be trustworthy. In children the dose should increase from $\frac{1}{20}$—$\frac{1}{10}$ mg. up to 1—3 mg., and in older children even to 5 mg. The newer forms of tuberculin, although useful for treatment, are unreliable for diagnosis.

In cases complicated with pulmonary tuberculosis greater caution has to be exercised, both as regards the size of the dose (a trial injection of $\frac{1}{1000}$—$\frac{1}{10}$ mg. must be given) and as to the interpretation of the results.

* * * * *

The **clinical manifestations** of tuberculosis of the skin have recently been more thoroughly investigated.

Lupus vulgaris is now generally recognised to commence in about seventy-five per cent. of cases in the mucous membrane of the nose, and to spread to the skin secondarily, so that most cases of lupus of the face should perhaps come in the first instance under the observation of the rhinologist.

[1] Alexander, *Berl. klin Wchnschr.*, 1907, xliv. 314, 344, 377.

Holländer distinguishes two varieties of lupus of the face, that affecting primarily the skin (cheeks, &c.), growing slowly, and not causing great destruction of tissue; and that affecting primarily the nasal mucous membrane, the more common variety, spreading rapidly, eroding the nose and attacking before long the face itself. "Lupus centralis faciei," Holländer has called it, and he pleads for a very active treatment particularly directed to ensuring freer nasal respiration (even by operation) with phototherapy.

Holländer also advises abortion if tuberculous foci are detected during pregnancy.

Lupus carcinoma,[1] that is to say carcinoma starting either in an active patch or an old scar of lupus, is a condition only lately described; in 1901 Ashihara collected accounts of 126 cases. The pertinent question is raised whether the X-ray treatment may not be responsible for this hitherto unknown tendency in lupus. "The possibility of such a connection should always be borne in mind, for it is well known that chronic X-ray dermatitis gives rise occasionally to cancer of the skin."

The possibility of tuberculosis cutis assuming malignant forms has been more than once suggested, and there is no doubt now that in particular situations, *e.g.* the alæ nasi and lobule of the ear, simple tuberculides may display a tendency to tumour-formation. Henk has found recorded fourteen cases of these "tuberculous tumours," which in their clinical course can only be described as "malignant."

Lupus Pernio is now an accepted fact (we notice that Hutchinson's long struggle on its behalf goes unrecognised in this paper of Alexander's), and it is admitted that the defective circulation which gives rise to chilblains also lays open the affected parts to invasion by the tubercle bacillus.

Lupus follicularis disseminatus faciei (of Tilbury Fox) appears as an acute or sub-acute eruption confined to the face in the shape of minute brownish-red or livid spots, soft, slightly raised, the size of a pin's head, sometimes apparently forming in the follicles; it must not be confused with the diffuse lupus which occasionally follows measles (*lupus disseminatus post-exanthematicus*), nor the very rare *generalised miliary tuberculosis* involving the skin with other parts.

Verruca necrogenica is referred to as showing a partiality for the Westphalian coal miners, possibly, as Fabry suggests, because under the influence of coal dust wounds remain open, yet aseptic, so that the tubercle bacillus finds itself in undisputed possession of the inviting surface.

Another group of skin affections less certainly tuberculous are classed under the term :—

[1] See also Sequeira, *Brit. J. Dermat.*, 1908, xx. 40.

Tuberculides. These include—

Folliclis.	Lupus erythematosus.
Lichen scrofulosorum.	Chilblain.
Erythema induratum.	Angeiokeratoma (Mibelli).

The distinction between a *tuberculide* and *tuberculosis cutis* may be said to be that while the latter is a local affection, depending on the presence of the tubercle bacillus, the former is in some way the product of the bacterial metabolism, so that Hallopean has even suggested the portmanteau word " toxituberculide " as more fully expressive of our present views on the nature of tuberculides.

But it is worth noting that Jacobi and Wolff have demonstrated the tubercle bacillus in the eruption of lichen scrofulosorum, and Pellizari and Haushalter obtained positive results from inoculation of animals ; that Philippson and Macleod have discovered bacilli present in folliclis, and that Thibièrge and Ravaut, Colcott Fox and Carle-Lyon have proved that erythema induratum is pathogenic for animals. Moreover, many of these tuberculides will give a positive tuberculin reaction. So we may conclude that at least some part of the tuberculide contains a living virus capable of propagation.

* * * * *

Treatment is dealt with very fully, particularly in the case of lupus, where the following general methods are in vogue.

Surgical (excision, scraping, &c.).—This is the most certain and effectual means of eradicating lupus, and should always be resorted to in a situation where the scar is of no moment. The skin should be excised over the area of surrounding skin which shows any sign of the local tuberculin reaction (Scholtze, Buschke, &c.), or speaking roughly, a margin of ½ to 1 cm. beyond the visible edge of the disease should be removed.

The hot air treatment of Holländer is especially valuable for tuberculosis of mucous membranes (nasal lupus) or for localised cutaneous foci. In most cases this treatment is not applied continuously, but is used for a short time as a preliminary to some other milder method, *e.g.* Finsen light.

Paquelin's cautery is recommended for small solitary nodules of lupus.

Among *chemical methods* Unna's stabbing with pure carbolic is excellent for circumscribed patches in which the nodules are fairly discrete. Arsenical and antimonial pastes are still applicable, and a newer corrosive, which displays an elective affinity for lupus in preference to normal skin, is Pyrogallol, first suggested in 1879 by Von Jaksch. Pyrogallol vaseline (10 per cent.) applied to the affected part for three or five days, followed by some simple emollient ointment, is said to prove successful even in the most refractory cases of verruca necrogenica. Ehrmann

suggests 33 per cent. resorcin ointment in place of the foregoing, and combines with it X-ray exposures, while other dermatologists employ for the same purpose crude hydrochloric acid saturated with chlorine.

Phototherapy includes Finsen's light (with its many modifications in the way of "iron-carbon points," Kromayer's quicksilvered quartz-lamp), radium, and the X-rays. Alexander regards the results as too well known and established to require very detailed consideration.

Lastly, he refers to the therapeutic use of tuberculin injections which Lassar, Blaschko and Lesser claim to have seen produce such good results in tuberculosis of the skin.

Alexander does not claim for any method an absolute superiority; he pleads for the healing of the patient, not a treating of the disease, and suggests the alternation and combination of any and every remedy, internal or external, which the behaviour of the local lesion and the general well-being of the patient may warrant.

J. A. NIXON.

Reviews of Books.

A Text-book of the Practice of Medicine. By HOBART AMORY HARE, M.D., B.Sc. Second Edition. Pp. xv., 1132. London: Henry Kimpton. 1907.

The second edition of Hare's *Practice of Medicine* contains much additional matter, and has undergone extensive revision, so that the book is very considerably enlarged. In carrying out his determination to include nothing that is uncertain and debatable, the author has occasionally been led to omit mention of important views, and even of accepted "symptom-complexes," notably in the case of "myasthenia gravis," which is quite inadequately referred to in the differential diagnosis of "bulbar paralysis." Also in rheumatic fever, as we see it in Europe, at any rate, it is something less than satisfactory when discussing endocarditis and pericarditis to state that "in rarer instances a myocarditis develops." The relative rarity is certainly open to question.

Dr. Hare's advice as to complete disinfection of rooms, clothes and books after influenza seems good, but is rarely acted upon in England. The value of lumbar puncture in doubtful cases of cerebro-spinal fever is undisputed, but the illustration of the operation being performed on a well-developed man sitting upright in complete possession of his senses will not help the

novice to operate with success under less favourable circumstances. In a restless, unconscious subject, with some degree of opisthotonos, there are many chances of failure—*experto crede!*

The danger of antipyretic drugs in croupous pneumonia is rightly insisted upon, and marks the timely revolt against a treatment that has for long enough pretended to a scientific justification. Venesection, on the other hand, meets with the just praise which but recently was denied to it. In fact, the treatment throughout the book is clearly detailed, temperately and accurately appraised, and the indications made thoroughly plain. There are very few text-books which deal with the subject more satisfactorily.

On the American Continent the opportunities for studying tropical diseases are perhaps more numerous and more accessible than in any other part of the world, and it is not surprising to find that particular attention has been paid to this branch of medicine; it is at the same time, gratifying to our insular pride to find the work of the English pioneers—Manson, Ross, Bruce, Leishman and Wright, with many others—handsomely acknowledged.

Dr. Hare's chapters on tropical diseases old and new give briefly and intelligibly a complete account of the most recent work that has been done throughout the world, and in these days of rapid travel even the most stay-at-home practitioner may find himself confronted with the strange maladies of other climes.

We cannot refrain from saying of the literary style that in America, thanks, no doubt, to the influence of Holmes, Emerson, Prescott and Motley, our common language seems to fare better at the hands of scientific writers than it is wont to do in twentieth-century England: this book is readable.

Cancer of the Stomach. By A. W. Mayo Robson, D.Sc., F.R.C.S. Pp. 218. London: James Nisbet & Co., Ltd. 1907.

This book forms one of the *Nisbet Modern Clinic Series*, and gives a succinct account of the subject, which will be found useful to the practitioner. It is admittedly wanting in much that is now known of the pathology of cancer of the stomach, and nearly half the book is taken up with descriptions of the various operations for the cure and relief of malignant stomach tumours that could be equally well obtained from works on operative surgery. To those who are familiar with the recent advances in gastric surgery and pathology it will not appeal, but to many who desire a clear and not too detailed summary of the present knowledge of the disease of which it treats the book will be welcome, and its value is enhanced by a liberal supply of helpful illustrations. The occurrence of cancer of the stomach is more common than is popularly supposed, and a greater familiarity with the symptoms

and operative possibilities in such cases is desirable for the general practitioner, in order that he may seek the advice of the practical surgeon in an early stage of the disease, in which alone a radical operation is possible with any degree of success.

The Internal Secretions and the Principles of Medicine. By CHARLES E. DE M. SAJOUS, M.D. Vol. II. Pp. xxv., 801–1873. Philadelphia: F. A. Davis Company. 1907.

In 1905 the late Sir Michael Foster referred to our knowledge of metabolism as consisting mostly of gaps and guesses, and Dr. Sajous has, in his work on the internal secretions, made a bold attempt to bridge over these gaps. The structure which he has put together is composed chiefly of the theory that the secretion of the suprarenal glands is the dynamic element in all the vital processes of the organism, and the keystone of his bridge is the hypothesis that the pituitary body acts as a control centre, presiding over the activity of the suprarenals, and in addition influencing and co-ordinating the movements of muscles, including the striped and unstriped varieties, also that the pituitary body receives all sensory impulses.

In Chapter XVI. the properties of the pituitary are treated on at great length and in a methodical manner, experimental and pathological data being produced to prove the importance of this organ as a nerve centre, as a governing centre to the sympathetic system, as a centre of common sensibility, and as a general motor centre.

The experiments of Marinesco, Vassali and Sacchi are quoted, in which the pituitary was destroyed by cautery. All the animals died when the removal had been complete, but before death they showed diminution of body temperature, anorexia and lassitude, muscular twitchings and tremors, developing into spasms and dyspnœa.

In support of the statement that the posterior tube of the pituitary is the seat of the sympathetic centre, reference is made to the experiments of Cyon, Masay and Brown-Séquard, the evidence showing that even slight pressure upon this organ caused variation in the blood pressure and a marked reduction of heart frequency. The observations of Cyon were confirmed recently by Masay, who showed that mechanical or electrical excitation of the pituitary caused a rise in the blood pressure from 81 to 200 mm. of Hg.

In support of the statement that the pituitary is the receiver of sensory impressions, the case of Goltz's dog is cited among others. In this instance the dog, after being deprived of its cerebral hemispheres, reacted promptly to tickle sensations, limped when

hurt, promptly raised its feet when these were placed in cold water, etc.

And that the removal of the pituitary abolishes sensation was shown by Cyon, who observed that its removal annulled nasal sensory phenomena such as sneezing, etc., and that all the nerves, including the fifth and the glosso-pharyngeal, lost their reflex influence.

Again, clinical evidence is deduced from such cases as acromegaly and sarcoma in which the posterior lobe is involved alone or in conjunction with the anterior lobe, as it is found that these conditions can provoke a great variety of motor disorders, such as spastic gait or paresis, disturbance of speech, paralysis of ocular muscles, muscular asthenia, unsteadiness of gait and impairment of co-ordination.

A large amount of space is devoted to applied therapeutics as regarded in the light of the author's views, and the subject has been dealt with very fully.

A Contribution to the Pathology of the Endometrium. By JESSIE M. MACGREGOR, M.D. Pp. 52. Edinburgh: William Green & Sons. 1905.

The observations recorded in this little work will prove of the greatest possible value to the gynæcologist. The pathological changes which take place in the endometrium are classified on a sound basis, and in place of describing the various forms of so-called endometritis, either by their naked-eye appearance or their clinical symptoms, the descriptions are based on careful and accurate microscopic observations of portions of structures removed by the curette. A large number of cases were examined in this way, and the various results tabulated with several very important results.

In the first and perhaps the most important instance the authoress has been able to lay down certain features which indicate the transitional stages between conditions usually regarded as benign and malignant disease. For example, she states that as long as the epithelial cells retain their cylindrical character with an ellipsoid nucleus the condition may be ranked as innocent, even though there may be many nuclei among their bases, and a tendency to break into irregular arrangement. If, on the other hand, the cells lose their cilia, tend to break into polyhedral and spherical shapes, and show irregular growth of well-formed cells with rounded nuclei, the verdict must be that the condition is malignant ; and this applies also to those cases in which at any part the cells break through the gland wall into the stroma. In the case where the specimen shows doubtful adenoma, she states that simple multiplication of glands which remain fairly equal in

size and regular in colour, even though the stroma is reduced to a few strands, is not necessarily a sign of malignancy. On the other hand, marked increase or irregularity in size of the glands, or papillary invasion of the lumen, is always suspicious. If the epithelium of the papillary ingrowth is young, its nuclei staining deeply, the case is distinctly suspicious, and if in addition there are areas of deeply-staining cells in the stroma the specimen may be regarded as malignant.

She shows the difficulties of diagnosis of early sarcoma of the endometrium, chiefly due to points of similarity between the stroma of the normal endometrium and sarcoma. Every variety of stroma cell, such as those of small round, large fusiform, or branching myxomatous type, can be compared with similar forms of sarcoma cells ; and even the giant-celled type may be found in *post-abortum* cases, where among all shapes and sizes of cells the wandering cells of the syncytium may be found.

The difficulties in the way of acurate diagnosis of sarcoma of the endometrium is thus shown to be very great. As regards inflammatory conditions, and more especially that usually described as uterine catarrh, the following classification is suggested : (1) œdematous degeneration ; (2) non-malignant new growth ; (3) persistent products of pregnancy ; (4) arterio-sclerosis. The authoress makes the very important practical deduction that in this case success in treatment depends on the removal of the endometrium with its leaky capillaries, this last condition being the cause of the hemorrhage which accompanies most of these changes. Hence curetting is the only method of treatment for cases in which decidual products have been retained. In arterio-sclerosis, on the other hand, curetting may be most baneful, and may cause such profuse hemorrhage as to necessitate hysterectomy, since in this case the rigid walled arteries will be laid open. The hemorrhage depends, therefore, not only on the leaky vessels of the endometrium, but also on the condition of the uterine wall and the general circulation ; or in other words, it may be caused either by the leaky and spongy endometrium or by changes in the deeper structures. The former condition is amenable to active operative treatment, but the latter is not.

This brief extract will serve as an indication of the care and attention with which this contribution has been written. It should be read carefully by everyone who practices gynæcology, since it shows very clearly that unless the interpretation of clinical symptoms rests upon an accurate pathological basis harm instead of benefit may result from active treatment indiscriminately applied.

We should like to express our regret for the sad circumstance of the death of the gifted authoress of this volume, from whom in the future much good work might have been expected.

Acute Pneumonia : its signs, symptoms, and treatment. By SEYMOUR TAYLOR, M.D. Pp. 64. London : Henry J. Glaisher. 1907.—These post-graduate lectures give the latest ideas on the subject, and are grounded on the view that pneumonia is an infectious disease which calls for fresh air and cleanliness for the benefit of the patient, and for all the sanitary precautions on the part of the nurse, which are taken in the case of a " spreading " disease such as erysipelas, such precautions, in short, as may be termed " medical Listerism."

Consumption : treatment at home and rules for living. By H. WARREN CROWE, M.D. Second Edition. Pp. 36. Bristol : John Wright & Co. 1907.—This little book is intended for those consumptives who cannot go to a sanatorium, or who cannot complete their cure there ; it gives the ideal treatment, whether in or out of a sanatorium. Experience has proved that the longer the treatment is carried out the more certain and lasting will be the cure ; the instructions contained in the book will enable any patient to carry on his cure indefinitely. It should be remembered that at first rest is the cure in combination with fresh air and good food. Exercise becomes needful for the purpose of regaining strength after the cure. Few patients can or will carry out the programme at its best, excepting under the discipline of sanatorium life, but the second best is sometimes the only thing possible, and determination will do a great deal when well directed by a reliable guide such as this.

Minor Medicine. By WALTER ESSEX WYNTER, M.D. Pp. x., 275. London : Sidney Appleton. 1907.—This treatise on the nature and treatment of common ailments is designed for the student in order to compensate for the undoubted facts that trifling disorders do not present themselves at a hospital, or are intercepted in the casualty department to spare the time and energy of the visiting staff ; hence the present-day student has little or no opportunity of familiarising himself with those slighter maladies, which are likely to be among the first encountered when he commences practice. The seventeen pages of prescriptions at the end of the volume are of especial use in consideration of the ignorance of the student, as well as of many practitioners, in the almost forgotten art of writing a prescription without the aid of the proprietary pharmacist. They are for the most part well tried formulæ, endorsed by the authority of some distinguished specialist.

The Treatment of Disease in Children. By G. A. SUTHERLAND, M.D. Pp. viii., 311. London : Hodder & Stroughton. 1907. Dr. Sutherland has written a book which deals as exclusively with treatment as is possible. The other virtues of his work are that it embodies his own experience and ideas without too much reference to those of others ; and, further, that his ideas are full

of common sense. There are many valuable paragraphs on the hygienic and dietetic treatment of disease in children, and the author makes it clear that he is no blind believer in drugs. Indeed, he appears occasionally to overstep the limit, and to condemn therapeutic methods whose value is beyond doubt. His dogmatism also leads him into statements which are scarcely tenable; for example, he says the colic of early infancy never afflicts properly-fed babies. On page 207 an "incompatible" prescription appears; calcium chloride with magnesium sulphate gives a calcium sulphate precipitate. The book is of undoubted value, in that it is a statement of experience by a physician who has seen a great deal of the diseases of children; but it needs to be read with discrimination on account of the faults pointed out in this review.

Manual of Practical Anatomy. By D. J. CUNNINGHAM, M.D. Fourth Edition. Two Vols. Edinburgh: Young J. Pentland. 1907.—It is always gratifying to be able to speak in unqualified praise about any subject for review. And we can do this without any hesitation in the present case. For lucidity of description and clearness of illustration it would be difficult to improve upon this little two-volume manual. But since it is only a short time since the appearance of the third edition, and as the present one is essentially the same, it is unnecessary to describe it at any great length. The chief changes and additions relate to the sections on the thorax and abdomen. Some new and most artistic illustrations have been added of the lymphatics of the breast, axilla and Scarpa's triangle, the thorax as seen from each side after the removal of the outer chest wall and the corresponding lung, the heart of a calf showing the moderator band, and of the external aspect of the eye. The division of the stomach into two chambers, with the anatomical distinction of the pyloric vestibule is described and figured. The pelvic fascia has a decidedly improved and simplified description. The account of the female perineum and pelvis still remains much inferior to that of the male, which, considering its greater practical importance, is a matter for regret, especially as this is a fault common to all text-books of anatomy. It is remarkable that a place should still be found for Luschka's picture of the diaphragm, representing it as having ten slips of costal origin on one side. On the whole, the book is perhaps the most lucid account of the essentials of anatomy ever published.

Surgical Applied Anatomy. By Sir FREDK. TREVES, Bart. Fifth Edition. Edited by ARTHUR KEITH, M.D. Pp. xii., 640. London: Cassell & Company Ltd. 1907.—This most excellent manual has passed through five editions during the last quarter of a century. The fifth edition maintains most of the admirable characteristics of the earlier ones, and sustains its reputation by

careful revision and the introduction of much up-to-date material. It is a storehouse of practical information, and is almost a necessity to those revising their studies for the higher examinations. In our opinion it is the best book of its kind, and we would be glad to see the inclusion in the next edition of an adequate description of the surgical anatomy of the uterus and broad ligaments, and illustrations of the lymphatics of the breast and stomach, in accordance with their surgical importance.

The Pocket Anatomy. By C. H. FAGGE. London: Baillière, Tindall & Cox. 1908.—Our old friend, which we all have secretly trusted and publicly abused, *The Pocket Gray*, now comes to us with a new and more sensible name. Its contents have not much altered, but all the alterations are improvements. The actions of muscles are now inserted in brackets after each one has been described, several of the arteries and nerves are described in a more tabular form. The lower part of the bowel is divided, and named as in all modern books the iliac colon, pelvic colon and rectum, the term sigmoid flexure being dropped. It has always struck us as very curious that in a cram book of this sort the one section of anatomy to be omitted is that on the bones, whilst those on the brain, eye and ear are inserted. The fact that 30,000 have already been issued proves the value which it has proved to many readers.

Hygiene of the Lung in Health and Disease. By Prof. Dr. LEOPOLD VON SCHRÖTTER. Translated by H. W. Armit. Pp. xv., 135. London: Rebman Limited. 1907.—This book was written by the eminent Viennese professor for the purpose of instructing the lay person on the functions of the respiratory organs, and on the importance which a free exercise of these functions possesses. The instruction of the laity will effect hygienic improvements far better than the introduction of new laws and punishments. The knowledge herein contained is calculated to enable the reader to become a useful member of the hygienic world, and to join effectually in the active crusade against that disease which has worked such ravage among men—tuberculosis. This English translation should greatly extend the usefulness of the book, and a wide circulation of it among Englishmen will do much to increase the popularity and utility of our sanatoria for consumptives.

Tropical Diseases. By Sir PATRICK MANSON, K.C.M.G., M.D., LL.D. Pp. xx., 876. London: Cassell & Company Limited. 1907.—To the general practitioner the territory of tropical diseases is a "blue" chamber which from lack of genuine curiosity he rarely enters. There is, however, but little doubt that the study of tropical ailments must in the future claim some of the time of the ever over-burdened medical student. The present advances against the ravages of disease in Africa, South

America and India are all preparing the way for the healthy life of the white man in those countries. By that time this fourth edition of some 900 pages will probably have expanded to a ten-volume system, or a tropical encyclopædia medica. Meanwhile, it behoves teachers of medicine to keep abreast with the demands of the time, and to make arrangements whereby students and practitioners may see imported cases of tropical diseases. A critical review of such a standard book as this is unnecessary. It only remains to say that it has been brought thoroughly up to date, and constitutes an admirable addition to English medical literature.

The Proceedings of the Royal Society of Medicine. Vol. I. Nos. I. and II. November and December, 1907. London: Longmans, Green & Co.—The amalgamation of the fifteen medical societies of London, and thereby the formation of the one Royal Society of Medicine with thirteen special sections has necessarily led to a simplification of the reports hitherto published by the fifteen separate societies. An editorial committee has been appointed, and each section has its own editorial representative on that committee. The proceedings will be published monthly, and will contain the papers read at each of the sections during the previous month. The matter is being so arranged that each section can, if desired, have its own portions detached and bound separately at the end of the year. The first two numbers are before us: they are well and carefully printed in excellent, readable type, and they contain several excellent full-page engravings. They are edited by Dr. John Nachbar, M.A., under the direction of the editorial committee. We cannot do otherwise than offer our congratulations to the committee on the form in which the work of the Royal Society of Medicine is being recorded.

The Romance of Medicine. By RONALD CAMPBELL MACFIE, M.B. Pp, viii., 312. London: Cassell & Co. Ltd. 1907.—The first two chapters, on the beginnings of medicine, describe a thrice-told story, but go a little further back than the Greeks and Romans, and give a brief account of certain medical papyri discovered in Egypt, and dating back to about 1600 B.C. The times of Hippocrates are well described, and afterwards come Aristotle and Galen, who in Rome did the work which has made him famous to all time. After a rapid survey of the Middle Ages, the renaissance of Greek learning in Europe, the revival of anatomy and the work of Harvey, we are told that "man is not only a menagerie, he is also an aquarium. His ancestor was probably a cell that floated in the circumpolar seas, and some of his cells still prefer a marine and briny habitat." This brings us on to the work of Virchow and of Metchnikoff, who is described as the greatest of living scientists. The cell and the microbe are evolutions of quite modern times. The story is quite an enchanting one, and will well repay something more than a cursory review.

Editorial Notes.

The Coming University.

Some of the essential principles in the preliminary steps towards the basis of formation of a Bristol University are under active consideration, and there is every reason to believe that everything will be satisfactorily settled very shortly. We hope there will be a liberal response on the part of the public who realise the value and importance of such a University to Bristol as a whole and to the neighbourhood of Bristol, in addition to the enormous assistance such an institution must have on the advance of higher education in the West of England.

It is hardly thinkable that Bristol will remain long without its University. In the past this city has sometimes allowed its opportunities to lapse for want of a little enterprise and initiative. At tremendous cost it has determined to make up leeway in its commercial aspects by the expenditure of nearly three million pounds for its new docks. It would be lamentable if similar policy with regard to educational matters led Bristol to allow this opportunity for acquiring University status to lapse.

The only question apparently is whether the coming University will be a strong union of available forces or somewhat less strong from lack of complete union.

We are glad to see that an effort is being made to raise sufficient funds to endow a Chair of Anatomy in memory of the late Dr. E. Markham Skerritt. His work in connection with the school is too well known to require any notice here; and we cannot imagine any happier way of perpetuating the memory of one who did so much for the Faculty of Medicine in University College, Bristol.

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Tuberculosis.

Dr. Bulstrode's supplement on "Sanatoria for Consumptives, and certain other aspects of the Tuberculosis Question."

Winsley Sanatorium Third Annual Report, 1907.

The various papers bearing on tuberculosis published in this

number, as also in a recent number of the *Practitioner* (May, 1908), are giving the subject a degree of prominence which only its great importance can justify.

Sir Dyce Duckworth, in his address to the Faculty of Medicine in Paris last February, emphasised the view that the great advances in laboratory work have directed especial attention to the seed, but it is all the more necessary that the soil, as distinct from the seed, should continue to have the fullest consideration. The clinical physician cannot give place entirely to the pathologist and bacteriologist, whose work, however valuable it may be, is only a part of the general management of the patient. Questions relating to the bacillus can only form a small part of the treatment of tubercular diseases, and hence the sanatorium should, and doubtless will, continue to take the leading place in the treatment of tubercular diseases. Questions of climate are dropping into the background, as it is now generally admitted that there is truth in the aphorism of Solly that "without hygiene climate is as sounding brass or a tinkling cymbal." It has been estimated by Flexner that at least 90 per cent. of human beings are at some time of their lives infected with the tuberculous virus, and the history of the coloured races in America—negroes and Indians—more recently also the liability to phthisis of the Irish race in America, shows how the neglect of hygienic conditions must in these cases lead to the extinction of tribes and races of mankind. The tendency is born in everything, and it is admitted that as the task of the extirpation of all tubercle bacilli is impossible, it becomes, therefore, indispensable to so strengthen and harden the body that the absorbed germs cannot take hold upon it. That is what our hygienic methods are attempting to do, and our sanatoria are going a stage further in endeavouring to stamp out the malady where it has already obtained a hold on the subject. It is admitted that early tuberculosis is a simple condition, easily cured; that the advanced disease is a complex one, cured with difficulty.

It cannot be admitted that fresh air acts as a specific poison to the bacillus: it may give better tone and improve the resisting

power, and so bring about "Nature's cure" without any adventitious aids; it is therefore at the basis of sanatorium methods. But the clinical cure depends upon the intelligence of the physician in charge, and the co-operative response of the patient, who must himself "work out his own salvation" by every means in his power. The endeavour to eradicate the disease has been well commenced, but it will not be accomplished in the near future. Whilst we know that 80 per cent. may recover if detected early, yet our results must inevitably fall short of this because of the difficulty of early detection. The patient does not know that he is consumptive till the disease has obtained a secure footing, and is often well advanced. In spite of the endeavours of the hygienic preachers—we know the facts, and the public are almost weary of much preaching—yet the appalling waste goes on.

Formerly the physician did his best to conceal his diagnosis of the fatal malady; the patient was kept in ignorance, even if the physician knew. The reluctance to accept the responsibility of a diagnosis was formerly justifiable, but it is not so now. The physician must not shirk the responsibility, a grave one, inasmuch as the curability of the patient depends on his acumen. We must find the consumptive early—early diagnosis is the transcendent requisite. Now the newer methods, the ophthalmo-reaction of Calmette, the methods of X-ray diagnosis, and all other means must be used to discover the disease at a date anterior to the presence of well-marked physical signs.

It is to be hoped that the simple hygienic treatment by sanatorium life will in the near future receive powerful assistance by means of tuberculin methods. Dr. Munro's paper (page 97) shows that under opsonic guidance the injection of tuberculin is not only safe but sometimes efficient. Evidence in this direction is accumulating day by day, and our sanatoria should in the near future give much better results than they have done hitherto; but for this funds are greatly needed, and we must appeal for a more sympathetic consideration from the philanthropic public, and a greatly increased financial support.

The following extract from the very full and detailed report on sanatoria, recently published by Dr. H. Timbrell Bulstrode on behalf of the Local Government Board, is worthy of careful consideration. He states that :—

> "In order to obtain the best results as regards working capacity, two things are necessary. One is that the case shall be suitable for treatment, and that the patient shall remain at the sanatorium long enough to prove by actual experience that he is competent to work : the other is that there shall be a period of after-care, during which the patient may gradually become accustomed to full work, and may, if necessary, learn the means of gaining a livelihood in the manner best suited for the maintenance of his health."

The general inference from a perusal of this report is that in the handling of tuberculosis among the working classes we are lamentably behind Germany, where the compulsory insurance system occupies a foremost place in the anti-tuberculous crusade, and is one of the most important agents in the production of a remarkable fall in the death rate from tuberculosis. Probably Bismarck did not foresee all the results of the insurance legislation of 1884, but it is most satisfactory that the results which have been obtained have been far in excess of anything which was expected.

We may, however, claim that the medical profession in this country has not been behindhand in endeavouring to induce the philanthropist and the public to follow in the footsteps of the German pioneers.

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"Confessio Medici."

THE author of *Confessio Medici* (Macmillan) writes a highly-entertaining book on the vocation of medicine. We quote the following as a sample of his views :—

"The setting of the life of a hospital—the buildings and such works of art as the hospital may possess—are shown to every visitor. But to observe its mind the visitor need not go farther than the hospital garden, that quiet place which is no more like

the outside world than home is like a music-hall. For the *genius loci* loves the open air, and the hospital garden is his sacred grove. And it shall be summer-time, with patients lying under the shade of the plane-trees, and nurses bringing tea to them; and students, bare-headed, playing tennis, or talking over the day's affairs, or just doing nothing. Of itself it may not be much of a garden, but we admire it as an open space, a great well of light and air, a shaft of health sunk into diseased and injured London. This pleasant, old-fashioned quadrangle, blessed with sunshine and silence, and an excellent view of the sky, is the centre of the hospital life, and a visitor loitering here will see that we are a brotherhood, and that the patients are our guests. Every hospital is a charity, but there is a difference between charity and hospitality. They who give money to hospitals are charitable; we who have the spending of it are hospitable, and of course it is we who get the fun out of the money. And we spend it well, entertaining in good style our innumerable guests. . . . Let us hold fast to the unity of hospital life, and to our bounden duty to the spirit of the place. . . . No profession gives to its students such a good introduction to things as they are."

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Territorial Army.

At a meeting of the profession, held in the Medical Library on March 20th to inaugurate the opening of the Public Health Laboratory of University College, Lt.-Col. Firth, R.A.M.C., spoke at some length on the subject of the "Sanitary Service of the Territorial Army." From his remarks we gather that the principal medical officer of an area would have on his head-quarters' staff a sanitary medical officer, who will advise him on all questions of sanitation in times of peace and war. In peace at training camps each regimental surgeon is responsible to his colonel for the sanitary condition of his camp, and for carrying out general orders issued by the head-quarters' sanitary officer. The Field Ambulance officers are only responsible for the condition of their own camp. In time of war, or when the troops are embodied, other sanitary medical officers—probably drawn

from the medical officers of health of the counties comprising the area—will be pressed into the service, and serve in their branch just as the *en suite* physicians and surgeons serve who are connected with the General Hospital.

We venture to suggest that this plan is inadequate. The regimental medical officer is a busy man, and would have insufficient time, and perhaps experience, to cope with any serious sanitary defect, such as water contamination, unfit camp surroundings, and epidemics; and we think that where a division, or even a brigade, is massed in camps, medical officers of health ought to be asked to be in a position of responsibility for the health of the troops.

The South-Midland area, to which Bristol belongs, comprises the counties of Gloucester, Warwick, Worcester, Oxford, Berkshire and Buckingham, and the head-quarters are at Birmingham. It seems to us a waste of good material for the division in camp not to have the advantage of the excellent and energetic medical officers of health that there are in Bristol and those counties.

Notes on Preparations for the Sick.

Novaspirin.—THE BAYER CO., London.—Novaspirin passes unchanged through the stomach, and therefore is not likely to cause gastric disturbances. In the intestines it decomposes into nascent salicylic acid and methylene-citric acid, without giving rise to irritation or unpleasant by-effects, such as tinnitus aurium, headache, cardiac depression, or renal irritation.

Chemically, Novaspirin is methylene-cytril-salicylic acid. It is a white, odourless powder of faint acidulous taste, easily soluble in alcohol, difficultly soluble in chloroform and ether, and almost insoluble in water. It contains 62 per cent. of salicylic acid.

Novaspirin has proved an excellent remedy in influenza, in which it promptly relieves the distressing pains, reduces the fever, and in general promotes the comfort of the patient. It is also equally valuable in the treatment of colds, such as coryza, tonsillitis and pleurisy, neuralgia, nervous headaches, tabes and carcinoma. The administration of Novaspirin is not followed by profuse perspiration, because the drug is absorbed so slowly—a matter of importance when diaphoresis is not desired, as in

cases of weak patients, grave cardiac affections, chronic wasting diseases, and danger of severe hemorrhages—nor has ringing in the ears been observed to follow the use of the drug. It is an efficient and agreeable remedy in the various forms of rheumatism, both articular and muscular, as well as in gouty conditions, and is also highly recommended in neuralgias—especially sciatica and intercostal neuralgia—and other painful affections.

The average dose for adults is 15 grs. several times a day; this may be increased to 30 grs. in rheumatic and gouty troubles. Owing to its insolubility in water, it is best administered in powders, wafers, or in the form of tablets.

Lecithin (Fairchild).—BURROUGHS, WELLCOME & Co., London.—Fairchild's various preparations have gained the esteem of medical men by their excellence, so that any comment upon them is quite unnecessary.

The product mentioned above is a liquid, containing one grain of lecithin in each teaspoonful. It is a very convenient way of administering this organic phosphorus compound, and its general properties render it an "elegant" production of modern pharmacy.

Kepler Malt Extract.—BURROUGHS, WELLCOME & Co., London.—This is now packed in a new bottle of much improved design, fitted with a cork-lined metal lid. The neck of the bottle is large enough to admit a dessert-spoon, and a cork-lined metal cap takes the place of the cork. This cap closes the bottle efficiently, and it is secured by a metal band which clips the cap and the rim of the mouth of the bottle. The whole arrangement is much more convenient and cleanly than anything previously designed.

Hemisine.—BURROUGHS, WELLCOME & Co., London.—The active principle of the medulla of the suprarenal gland. This solution of the crystalline active principles, physiologically standardised to one in a thousand, may be used as it is or diluted with normal saline, obtained by dissolving soloids of sodium chloride. Locally, it produces an intense anæmia of the mucous membrane. It may be prescribed internally: (1) To produce a local vaso-constrictor effect on the mucous membrane of the alimentary canal, especially of the stomach, *e.g.* to arrest hemorrhage from acute gastric ulcer, 5 minims of Hemisine 1 in 1,000 solution, in water, or one "Tabloid" Hemisine, 0.0003 gramme (approximately gr. 1/200), are administered, and repeated as required. (2) To exert, after absorption, a tonic action on the sympathetic nervous system, on the circulation,

and on the uterus. For this purpose 15 minims of Hemisine 1 in 1,000 solution, in water, or one "Tabloid" Hemisine, 0.001 gramme (approximately gr. 1/64), are given two or three times daily, according to the reaction of the patient.

Hemisine products are issued in a variety of forms for various purposes, and in various compounds with eucaine, cocaine, atropine, etc. The wide range of utility of this large series of preparations is obvious.

"Tabloid" Phenol and Menthol Compound.—BURROUGHS, WELLCOME & Co., London.—Each contains:—

Phenol, gr. $\frac{1}{4}$.
Menthol, gr. $\frac{1}{2}$.
Oil of Cajuput, min. 1.

"Tabloid" Phenol and Menthol Compound will be found a pleasant and effective means of administering this gastric stimulant and antiseptic. The combination is useful to promote appetite and digestion, to relieve pain in dyspepsia, and to prevent or arrest fermentation in dilated stomach. It is of service in flatulence, fermentative dyspepsia, and in those cases where stomach lavage is commonly practised. It exercises an antiseptic and carminative effect in the intestine, and so is of value in griping, and in cases where improper fermentative changes occur in the bowel. The gelatine envelope preserves the contents from the action of the atmosphere, and the shape facilitates swallowing.

Analgesic Balm.—PARKE, DAVIS & Co., London.—This preparation is a combination of methyl salicylate, menthol and lanoline. It forms an efficient means of applying these remedies in the treatment of arthritic inflammations and painful affections generally. It is very effectual in nerve pains, in trigeminal and intercostal neuralgias, sciatica, etc., and applied to the forehead in frontal headache or migraine, it affords relief from pain. It also forms a very useful dressing for small contusions and for sprains, provided the skin is not broken. The collapsible tubes in which it is packed are very convenient for storage or transport, and for expelling the necessary quantity for the occasion, whilst the bulk is in no way exposed to deterioration.

Pill Aloin and Phenolphthalein Compound.—PARKE, DAVIS & Co., London.—This combination of aloin, strychnine, belladonna, phenolphthalein and ipecacuanha, has been found very effective in the treatment of chronic constipation, and for the relief of migraine, hepatic torpor, and kindred disorders. The ingredients are carefully assayed to ensure reliable activity, and the

pill operates promptly and thoroughly, yet without discomfort, whilst its gelatine coating effectually conceals the taste of the medicaments.

Solurol: Thyminic Acid, a new remedy for gout.—ALLEN & HANBURY, London.—This drug is described as the natural organic solvent of uric acid, and has been given with much success in those gouty and rheumatic conditions which are due to an excess of uric acid. In such cases the painful symptoms of the disease are quickly alleviated, and the duration of an attack is very much shortened. Sometimes in an acute attack of gout the pain and inflammation may be somewhat increased for a short period, but this quickly passes. If Solurol be taken regularly on the first threatening of an attack of gout, the attack can often be aborted.

It has no prejudicial or depressing action, but simply helps the elimination of uric acid by retaining it in solution, thus preventing the deposition of urates in the tissues.

A four-grain tablet may be taken three times a day.

Fermenlactyl.—ANGLO-AMERICAN PHARMACEUTICAL CO., Croydon.—A pure lactic ferment, prepared from the special bacillus of Bulgarian Milk from cultures isolated in the Pasteur Vaccine Company's laboratories of Paris. It is put up in tablet form. These may be crunched and swallowed, or may be used for the preparation of a special Bulgarian Milk diet in accordance with the special directions given.

Fermenlactyl is indicated in the following diseases:—

(*a*) Affections of the digestive tube, gastro-enteritis, infantile diarrhœa, dysentry, intestinal tuberculosis, typhoid fever, chronic intestinal infection, and for the treatment of diabetes, in which disease the lactic ferment destroys the sugar.

(*b*) Fermenlactyl is also indicated for reducing to a minimum the source of organic intoxication, cirrhosis of the liver, chronic nephritis, cardiac affections, gout, gravel, arterio-sclerosis (old age), arthritis, furunculosis, urticaria.

(*c*) Fermenlactyl may also be prescribed in cases where patients are submitted to an alimentary diet liable to increase intestinal fermentation, such as the feeding of children with sterilised and unsterilised milk.

Those who adopt the views of Professor Metchnikoff as to the causes and prevention of old age will doubtless be disposed to give this preparation a prolonged and persevering trial.

Ovaltine.—A. WANDER, 24 Queen Victoria Street, London.—Ovaltine is a food for children and invalids, its special feature being the presence of Lecithin.

As is well known to the medical profession, Lecithin is an organic phosphorus compound, which can be extracted from nervous tissues, and which acts as a nerve restorative.

Ovaltine has certainly one great advantage over many artificial foods in not being excessively sweet, but yet possessing a very pleasant taste.

A portion was ignited and the ash examined for the presence of phosphorus, which was found present to a marked extent. We have every confidence in recommending a trial of this food.

Formitrol Pastilles.—A. WANDER, Berne and London.—These pastilles contain formaldehyde, menthol, citric acid, and sugar of milk. They should have an excellent effect in favouring oral antisepsis in infectious conditions of the mouth and throat.

"Ju-Vis" Preparations.—FOSTER, CLARK & CO., Maidstone.—The preparations made by Messrs. Foster, Clark & Co. have been before the public for some considerable time, and are gaining for themselves a good reputation. The distinguishing feature is their low price, combined with satisfactory quality.

Ju-Vis is an extract of meat combined with vegetables, which can be obtained either as a liquid, or in the form of tablets

These extracts are accompanied by the makers' guarantee of purity, which is not always the case with similar substances.

We have examined a specimen of the tablets, and find them to consist of the ingredients stated; they are therefore valuable, and are also palatable food products.

Armour's Pharmaceutical Preparations: Nutritive Elixir of Peptones, Glycerine Extract of Red Marrow.—Holborn Viaduct, London, E.C.—The firm of Armour & Co. has very excellent facilities for producing medicinal preparations of animal origin, ranging from extract of beef to the more active principles obtained from various "ductless glands."

From time to time we have examined these products, but have recently paid special attention to the above-mentioned examples of the enterprise of Messrs. Armour & Co., namely Nutritive Elixir of Peptones, and Glycerine Extract of Red Marrow. The former contains no coagulable proteid, but gives reactions for peptones, and should therefore be readily assimilated. It contains a small amount of alcohol, which is probably derived from the sherry used in its manufacture. It may be well described as a "Nutrient Restorative."

The extract of Red Bone Marrow is a pleasantly flavoured elixir, and gives well-marked spectroscopic evidence of the presence of hæmoglobin. This renders it a valuable means of administering an organic compound of iron in cases of anæmia and similar diseases.

Alexine.—THOMAS CHRISTY & Co., London.—In the treatment of the fashionable complaint neurasthenia this granular powder is likely to become useful. It is composed for the most part of pure phosphoric acid, but in order to lend perfect stability to the preparation it is made to include a small portion of the bi-phosphate of manganese and a small quantity of the bi-phosphate of iron. It is readily soluble in water, to which it imparts an agreeable, slightly acid taste. The dosage is rendered particularly simple by the method in which the preparation is put up. The glass stopper is hollowed so as to contain an amount of the powder which, when dissolved in about three parts of a tumblerful of water, constitutes the dose for an adult. For children, between two and five years, this dose is halved. One great advantage of its agreeable taste is that it can easily be mixed with the beverages which are usually taken at meals, such as lemonade, wine, and the like.

Assimilable phosphorus is believed to be the food par excellence for the higher centres of the nervous system, hence a compound of this kind should be much in demand for cases of either real or fancied nervous debility, for which all the resources of the pharmacopœia are sometimes apparently useless. It should also materially shorten the prolonged convalescence after influenza and other acute diseases.

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the List in March:

May 31st, 1908.

Professor Walker Hall (1) .. .. 1 volume.
J. Taylor .. .. Unbound periodicals.

SIXTY-EIGHTH LIST OF BOOKS.

The titles of books mentioned in previous lists are not repeated.

The figures in brackets refer to the figures after the names of the donors and show by whom the volumes were presented. The books to which no such figures are attached have either been bought from the Library Fund, or received through the *Journal*.

Arthur, W. B. .. *Supplementary First Aid to Miners* 1908
Atkinson, S. B. .. *The Law in General Practice* 1908
Bardswell and J. E. Chapman, N. D. *Diets in Tuberculosis* 1908

Brunner, C. .. .. *Tuberculose, Aktinomykose, Syphilis des Magendarmkanals* 1907

Campbell, J. .. .. *A Text-Book of Treatment* .. Part I. 1908

Chapman, N. D. Bardswell and J. E. *Diets in Tuberculosis* 1908

Edmunds, A... .. *Glandular Enlargement* 1908

Encyclopedia and Dictionary of Medicine and Surgery, Green's Vol. VII. [1908]

Freyer, P. J... .. *The Surgical Diseases of the Urinary Organs* 1908

Harman, N. B. .. *Aids to Ophthalmology* .. .. .. 4th Ed. 1908

Howell, H. W. Wilson and C. M. H. *Movable Kidney* 1908

Jones, J. A. .. .. *A Short Practice of Aural Surgery*.. 1908

Keith, S. and G. E. *Cancer; Relief of Pain and Possible Cure* .. 1908

Kenealy, A. .. .. *The Failure of Vivisection and the Future of Medical Research* .. .. [1908]

Kenwood, H. R. .. *Public Health Laboratory Work* .. 4th Ed. 1908

Leedham-Green, C. *The Treatment of Gonorrhœa in the Male* 2nd Ed. 1908

Lloyd, W. .. .. *Hay-Fever, Hay-Asthma* .. 2nd Ed. 1908

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MEETINGS OF SOCIETIES.

Bristol Medico-Chirurgical Society.

March 11th, 1908.

Dr. HENRY WALDO, President, in the Chair.

Dr. CAREY COOMBS showed specimens from the **myocardium in acute rheumatism,** drawing attention to the nodules composed of aggregations of large spindle-shaped, polynuclear cells occurring in the neighbourhood of arterioles. They were chiefly met with in the muscle of the left ventricle, near the apex. He was inclined to regard them as the result of a fibro-blastic reaction (peculiar, perhaps) to the rheumatic virus.

Mr. W. ROGER WILLIAMS inquired whether there was any similarity between these formations and the sub-cutaneous nodules which Charcot had considered such a certain sign of the "arthritic diathesis."

Mr. S. V. STOCK read notes of a case of **Carcinoma of the Breast,** in which metastasis occurred after an interval of twenty-four years. The breast had been amputated twenty-four years previously. A few days after the operation the dressings were accidentally set on fire, and the patient was severely burnt; erysipelas supervened, but after a prolonged illness a good recovery was made, and the patient was free from any recurrence. In May, 1907, the patient noticed a lump in the right iliac fossa, which Sir Thomas Smith (who had performed the first operation) and Mr. Bowlby diagnosed as a growth in the right ovary, but regarded as inoperable. The growth increased rapidly, nodules appeared above the clavicle, on the sternum, and ultimately in many other situations, either in glands or in subcutaneous tissues. Some glands were removed from the groin with a local anæsthetic, which under the microscope showed clear evidence of being carcinoma secondary to a primary mammary growth. Ultimately the patient died (eight months after first noticing the mass in the pelvis), with symptoms of cerebral metastasis. The reasons for the long period of quiescence and the possible channels of transmission were considered at some length.

Mr. HEY GROVES pointed out the necessity of accepting with

some reserve the pathological report that the carcinoma of the gland submitted to examination was indubitably secondary to that in the breast, and also the diagnosis of the mass in the pelvis as being ovarian, in the absence of proof obtained by operation or by necropsy. On the whole, however, he agreed that probably the explanation given was the correct one, although such an occurrence must be very rare.

Mr. ROGER WILLIAMS drew attention to the relative chronicity of mammary cancer, saying that from data he had collected one case in twelve lasted for more than five years, several cases lasting fifteen, twenty, and even thirty years with ultimate recurrence; particularly was this true of melanotic sarcoma. He questioned the part played by lymphatic paths in recurrence or metastasis. Might not the traumatism of the operation liberate into the circulation cells in a pre-cancerous stage, which lodge, rest, and then owing to some change in the metabolism of the body take on their usual malignancy in some remote situation?

Mr. C. B. GOULDEN read a paper on **Lachrymal Obstruction,** in which, after briefly reviewing the anatomy and physiology of the lachrymal sac and nasal duct, he went on to deal with the causes of obstruction, most of them being due primarily to diseases in the nasal mucosa, or to caries of the nasal and lachrymal bones from tuberculosis or syphilis. He insisted on the dangers of acute or chronic dacryo-cystitis, especially the risk of operation on an eye where dacryo-cystitis was present. The treatment advocated for epiphora without mucocele consisted in bringing the puncta into correct apposition with the globe either by slitting the canaliculus, or, better, by producing with the actual cautery a scar between the inner canthus and punctum, which by contraction would restore the latter to its true position. For mucocele he advised treatment of the nose if required, and syringing of the sac, but unless this proved successful in six weeks, excision of the sac must be resorted to. For dacryo-cystitis the sac should invariably be excised. The use of probes and styles he utterly condemned.

Dr. OGILVY was of the opinion that the presence of a mucocele did not actually justify so gloomy a view of operations on the eye. He had of necessity had to operate in the face of this complication, and his patients had not fared so badly as might have been expected, nor to his mind was probing and the use of styles entirely without value.

Mr. CYRIL WALKER pointed out that excision of the sac had been the universal rule until Bowman suggested and proved the efficacy of probing. Probably the advocates of excision would learn the same lessons by which Bowman had profited, and might admit that of two not wholly satisfactory procedures, Sir William

had adopted the more generally useful. He drew attention to some methods by which the difficulties and dangers of passing probes and inserting styles could be minimised. If excision of the sac were practised, care should be taken to avoid dividing the tarsal ligament.

Dr. A. FELLS read notes of a case of **Urobilinuria associated with Polycythæmia** occurring in a woman, aged 37, who had been long resident in India, and had suffered from sunstroke and many bouts of fever. In 1901 she returned to England, and first began to complain of shivering fits and attacks of pain in the left side, which radiated down the leg. In 1906 she became liable to attacks of fainting, with extreme irritability and restlessness. She then had intermittent pyuria with pyrexia. The right kidney was explored, and being found movable but otherwise healthy was fixed by suturing. Subsequently headache, neuralgia, insomnia, constipation and profound muscular weakness successively developed, and the urine became of a clear port-wine colour. The blood-count showed an increase of erythrocytes (6,500,000) without leucocytosis. Eventually the patient died with increasing myasthenia and paralysis extending gradually from the extremities to the respiratory centres. The urine had been examined, and reported to contain "urobilin." The case was probably one of auto-intoxication from the alimentary tract. The patient had taken sulphonal, but not to excess.

Dr. SYMES considered that a case showing such persistent and long-continued urobilinuria was probably unique. He agreed with Dr. Fell's suggesiton of toxæmia as the explanation.

Dr. EDGEWORTH said he felt no doubt that the specimen of urine shown contained hæmatoporphyrin, and that the case was one of sulphonal poisoning, ending, as such cases frequently do, in peripheral neuritis.

Dr. NIXON inquired as to the tests which had been relied on for establishing the presence of urobilin and the absence of hæmatoporphyrin, since he was convinced that, whatever else the urine contained, the colour was due to hæmatoporphyrin.

Dr. WALDO detailed a case which he had treated of a man who had died of chronic sulphonal poisoning with hæmatoporphyrinuria. The similarity in the course of the disease to that of Dr. Fell's case was striking, and he could not help thinking that probably hæmatoporphyrin was present in this instance also.

A small sub-committee was asked to examine the urine, and report on its composition to the Society at some later date.

April 8th, 1908.

Dr. HENRY WALDO, President, in the Chair.

Mr. W. SAMPSON HANDLEY gave an address, illustrated with

lantern slides, on **Breast Cancer in its relations to the Lymphatic System**.

Mr. ROGER WILLIAMS alluded to the difficulty of explaining certain metastases by lymphatic permeation, and asked, for example, how lymphatic permeation could account for a secondary cancer in the suprarenal gland from primary cancer of the tongue, as in a recorded case? Secondary cancer in a uterine myoma from primary breast cancer could hardly be explained by permeation. How could permeation explain the fact that secondary cancer had been passed to a fœtus in utero? The speaker thought the permeation hypothesis was destined to have only temporary vogue. The address was discussed also by Messrs. MOLE, GROVES, CARWARDINE, WALTERS and VICKERY, and Mr. HANDLEY replied.—A cordial vote of thanks was given to Mr. Sampson Handley for his address.

May 13th, 1908.

Dr. HENRY WALDO, President, in the Chair.

Dr. SHINGLETON SMITH proposed and Mr. NELSON C. DOBSON seconded the following Resolution, viz.: "That this Society welcomes the proposal to establish a University in Bristol, believing that it will act as a stimulus to learning, serve as a centre of research and prove a lasting benefit to education in the City, more especially to the Medical School, which has hitherto felt the handicap of its inability to confer degrees upon its Students." The Resolution was passed unanimously.

Dr. WATSON WILLIAMS showed a case illustrating the **Osteo-plastic operation for Frontal Sinus Disease.** The patient, a man, had suffered from severe frontal and general headache, and had had a purulent nasal discharge. A left antral abscess pointing in the cheek had been first dealt with. Later, on the same side, the frontal sinus had been opened, and the eyebrow incision prolonged down the side of the nose. The lachrymal groove was then exposed through a second incision at the lower margin of the orbit, the nasal process of the maxilla, etc., sawn through from within and turned outwards as an osteo-plastic flap, and the ethmoid cells and sphenoidal sinus thoroughly curetted. Lastly the frontal sinus on the other side had been dealt with through another incision, and also the antrum on that side. The disfigurement was practically *nil* and the relief of symptoms great.

Dr. MICHELL CLARKE showed (1) a specimen of **Tumour of the Pituitary Body,** and (2) gave an account of two cases of **Tumour of the Temporo-Sphenoidal Lobe of the Brain.**

Dr. FORTESCUE-BRICKDALE read a paper on **Calmette's Ophthalmo-Reaction.** (Page 112.)

J. LACY FIRTH,
J. A. NIXON, *Hon. Sec.*

Local Medical Notes.

University College, Bristol.—Recent examination successes:

M.B., B.S. Lond.—C. E. K. Herapath, F. S. Scott, L. J. Short, A. N. Thomas, and R. E. Thomas.

F.R.C.S. Eng.—A. Rendle Short, M.B., B.S. Lond.

M.R.C.P. Lond.—Carey F. Coombs, M.D. Lond.

Intermediate M.B., B.S. Lond.—R. M. Hiley. *Organic Chemistry:* W. Salisbury. *Inorganic Chemistry:* E. S. Abraham.

Conjoint Board.—*Practical Pharmacy:* M. W. Morrison. *Biology:* C. Kingston. *Anatomy and Physiology:* C. H. Hart. *Medicine:* E. R. Sircom, E. J. Dermott,* P. S. Tomlinson,* E. V. Connellan,* F. S. Scott.* *Midwifery:* E. Christofferson, F. C. Nicholls, E. E. Davies, B. Stone, C. Clarke.

L.D.S.—*Chemistry and Physics:* R. A. Slade.

Bristol Dental Students' Society.—A society with this title has been formed amongst the students for the reading and discussion of papers on dentistry and allied subjects. The meetings are held monthly, and all present and past students of the school are eligible for membership. The subscription is only a nominal one, as it is hoped to obtain the support of all the past and present students. Mr. Ackland has been elected president for this session.

Anatomical and Anthropological Society.—With Professor Fawcett as President, and many eminent professors as Vice-Presidents, this Society, comprising the majority of the students of the Faculty of Medicine, has held several successful meetings during the past winter session. The papers read by the students have reached a high degree of excellence, many of them being illustrated by lantern slides. During the present summer session the meetings will be resumed on Fridays at 5 p.m.

Bristol Royal Infirmary.—F. H. Rudge, M.R.C.S., L.R.C.P., has been appointed House Physician.

Bristol General Hospital.—The following appointments have recently been made:—*Senior House Surgeon:* E. Maynard, F.R.C.S., has been appointed. *House Physician:* J. W. J. Willcox, M.B., B.S. Lond. *House Surgeon:* A. E. Iles, M.R.C.S., L.R.C.P. *Assistant House Physician:* L. J. Short. *Casualty Officer:* P. S. Tomlinson, M.R.C.S., L.R.C.P.

Bristol Royal Hospital for Children and Women.—The annual meeting of the subscribers to this institution was held on

* Denotes qualification.

March 31st, under the Presidency of Lord Winterstoke. The medical report stated that during 1907 the in-patients numbered 785 (727 children and 58 women), a decrease compared with 1906. The out-patients numbered 4,662, as compared with 5,500 in the previous year. The financial statement showed that the total adverse balance against the institution was now about £4,000. The committee states that as a result of its special appeal for £10,000 (which will be utilised for freeing the hospital from debt, for building a small scarlet fever annexe, and for improvements in the out-patient department), the sum of £5,209 has already been received.

Bristol Queen Victoria Jubilee Convalescent Home.—The eighth annual report of this institution has just been issued, and shows the usefulness of the institution. The number of patients admitted in 1907 was 1,533, making a total since the foundation of 11,163. The average stay of each patient was seventeen and a half days, and the average increase in weight during their stay was just under three pounds. With regard to the finances, a balance of £472 was carried to the current year. The income amounted to £3,158, and the expenditure to £2,641. A sum of £400 has been placed to the special repair fund. The medical officer reports that of the 1,533 patients admitted, 1,447 were discharged much better for their stay, 58 were unimproved in health, whilst 28 were returned to the institution from which they were sent for further treatment. There was no loss by death during the year.

Medical Inspection of School Children.—At the meeting of the Bristol Education Committee, held on April 30th, it was decided to appoint five "part-time" medical officers as inspectors of school children at salaries of £100 per annum, one at least of these officers to be a woman. It is proposed that each officer shall devote to this special work between two and three hours per day for three days of the week. In addition two health visitors, who will be certificated nurses, are to be appointed, at annual salaries of £70 each.

Gloucester Infirmary.—The annual meeting of the subscribers to the Gloucester Infirmary and Gloucester Eye Institution was held on March 26th. The medical report stated that 1,390 patients were admitted during 1907, an increase of 91 as compared with 1906. The out-patients numbered 8,412, being 500 less than in the previous year. The average cost per bed was £84. The financial statement showed that the deficit of £956 remaining at the close of the year 1906 was now reduced to £186.

University College Public Health Laboratory.—For the inaugural meeting of this laboratory, the Council were fortunate in obtaining the assistance of Lt.-Col. R. H. Firth, R.A.M.C., and Professor Dreyer, of Oxford.

The large attendance of medical officers of health, and of those interested in clinical pathology, evidenced the interest taken in the project. Dr. Michell Clarke presided, and explained that the Council of the College had taken over the clinical research work recently carried on by Professor Stanley Kent, and had appointed Dr. J. Fortescue-Brickdale as Director. A Consulting Board of Experts had also been constituted, in order that the field of investigations might be widened. He then introduced Lt.-Col. R. H. Firth, who gave a forcible and telling address upon the "Sanitary Service of the Territorial Army." Later, Professor Dreyer described his methods for the performance of Widal reactions in typhoid fever.

University of Bristol.—A further step towards the granting of a Charter for the University of Bristol was made when the City Council, at their last meeting, pledged themselves to support financially the scheme.

In moving the adoption of the recommendation of the Committee appointed to consider the question of giving financial support to the proposed University, Dr. Cook, in his illuminating speech, left no part of the case for a University in Bristol untouched. He laid stress on the tardy awakening of English public opinion to the value of the fullest scientific and technical instruction. We in England have allowed Germany a long lead, but we are rapidly overtaking our deficiencies, and perhaps our very delays have enabled us to avoid some of Germany's mistakes. The old Universities have within recent years made great advances in equipment, and they contemplate greater. The new Universities—to which Bristol is soon to add one more—have entered on a field peculiarly their own, with every prospect of doing brilliant and fruitful work in it. To make the educational system of our ancient city complete and self-sustained, from the bottom to the top, ought to be an object of pride and ambition to every citizen. It cannot be so while students have to go elsewhere for degrees. And there is an "atmosphere" favourable to culture which comes from the establishment of a local University, as the industrial cities of the North have proved. The promise of civic support is a condition precedent to the granting of a University Charter. We are glad that the promise has been given, although the extent of the aid is left for future decision. The city has a great opportunity, and is seizing it. There were few evidences at the meeting of the "mistrust" which the Bishop of Hereford deprecated in his recent eloquent appeal. We hope they will not obtrude themselves later. Heavily rated though Bristol is, the prospect of a halfpenny, or even a penny, more by and by for so great a purpose is little compared with the prospective gain. "From the lowest point of material progress," as Mr. G. E. Davies very well put it, "the establishment of a University will be of enormous advantage."

RICHARD SMITH,
Surgeon to the Bristol Royal Infirmary, 1796–1843.